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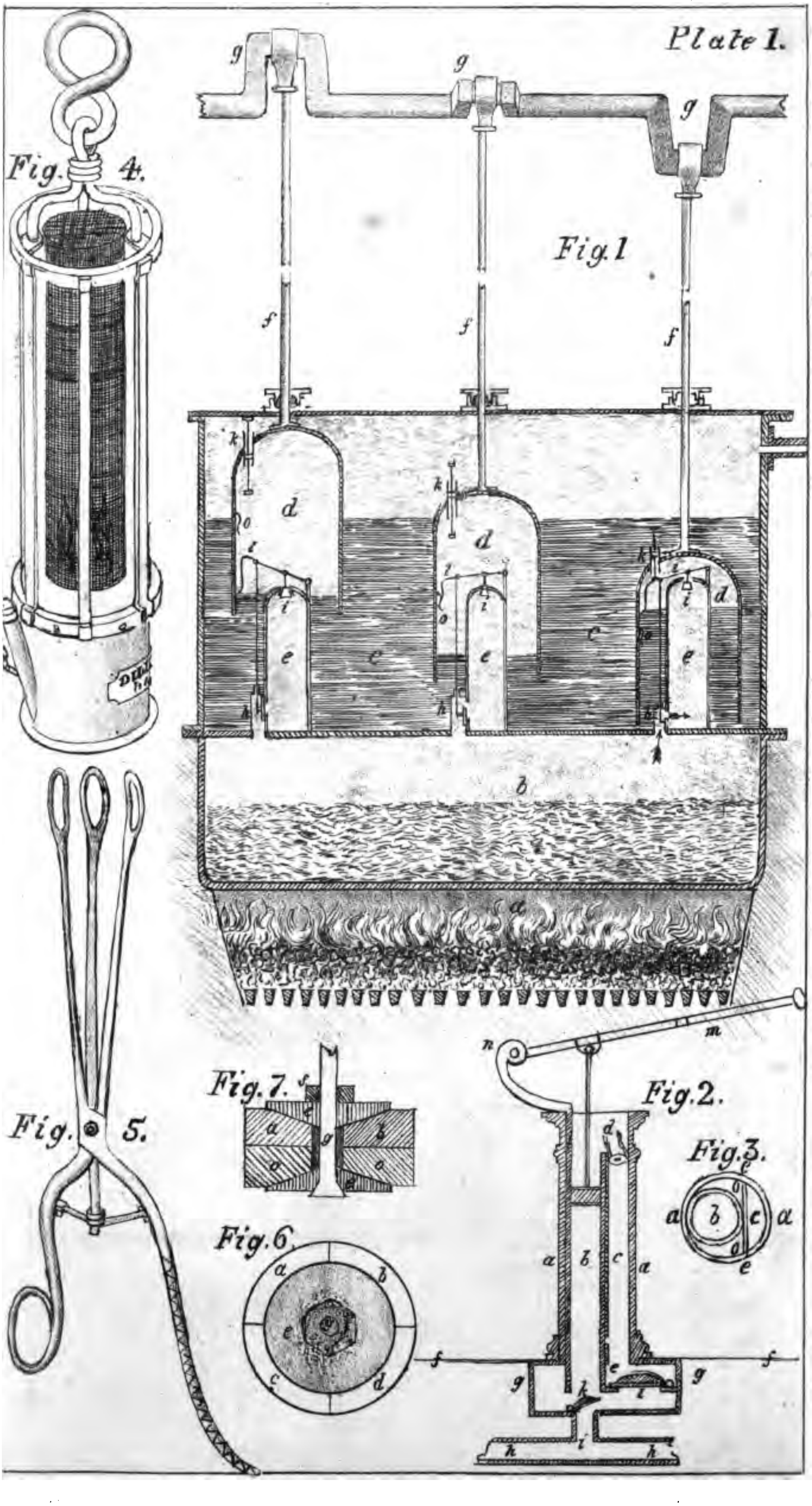

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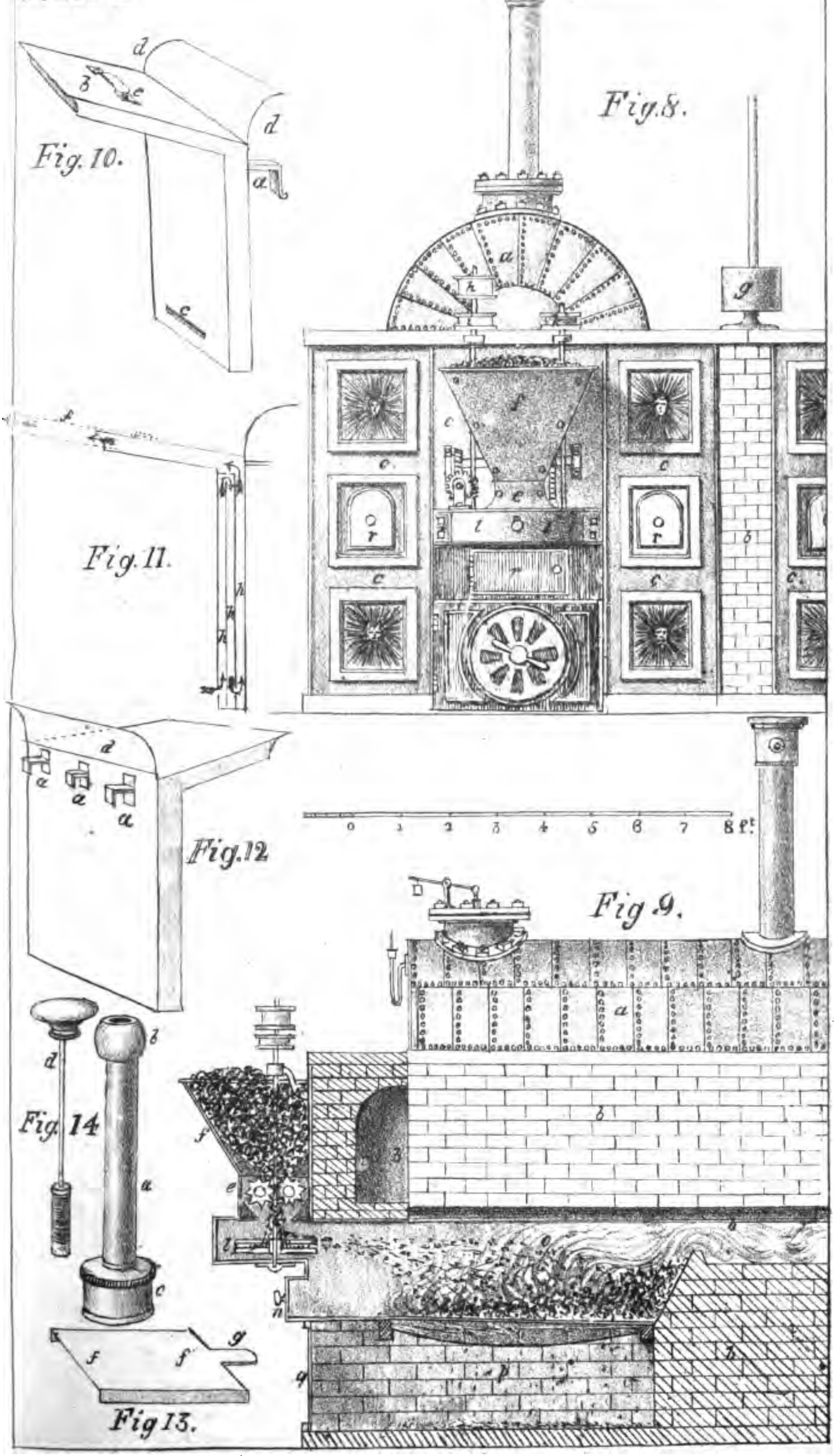

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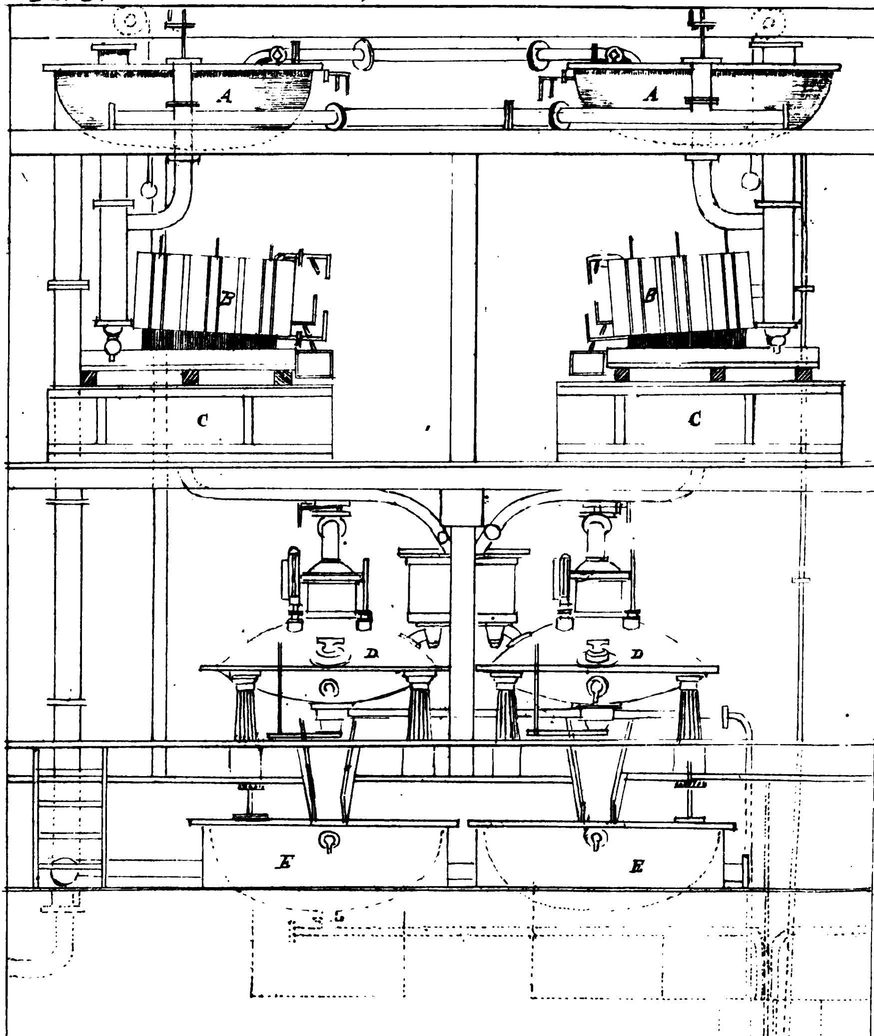

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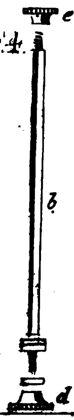

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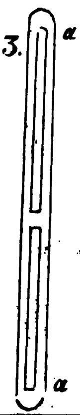

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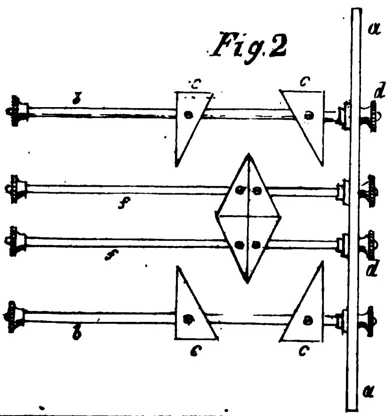

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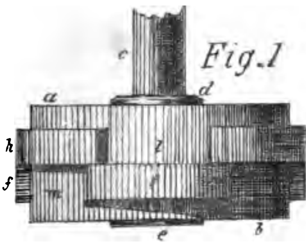

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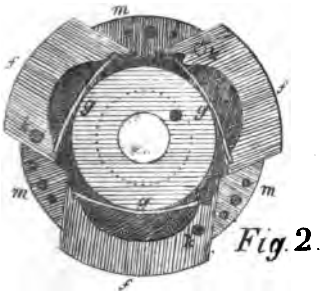

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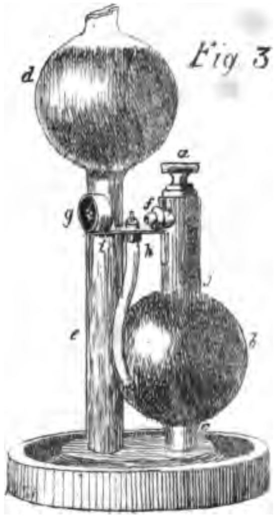

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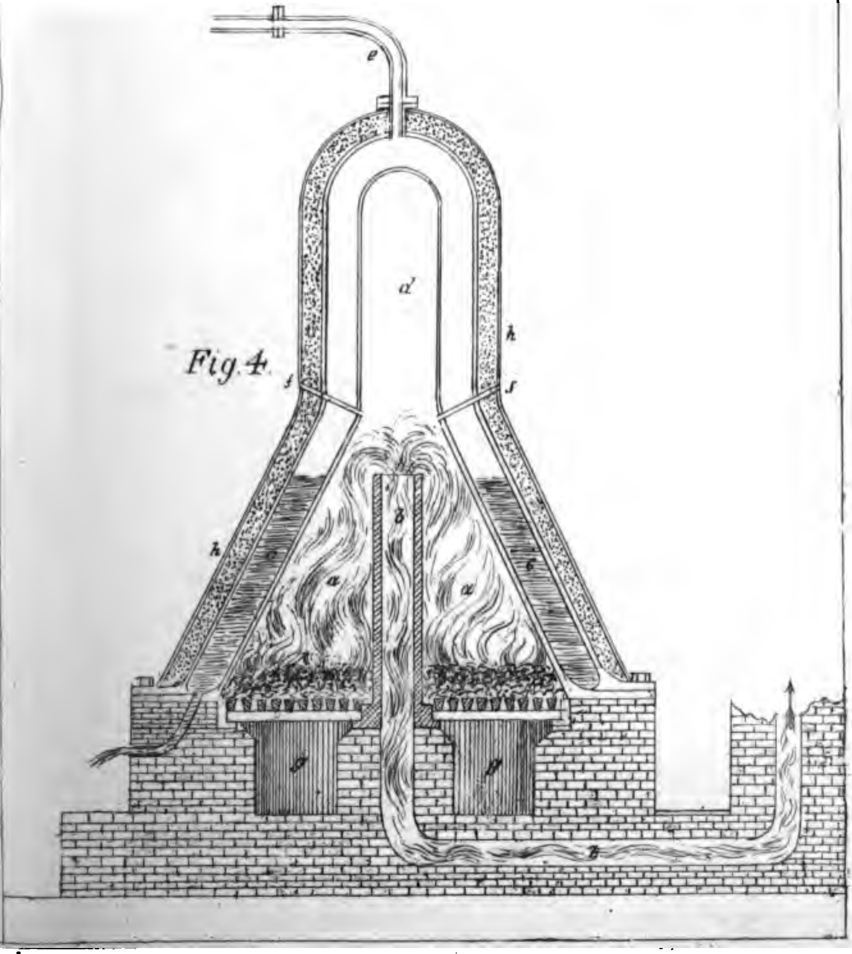

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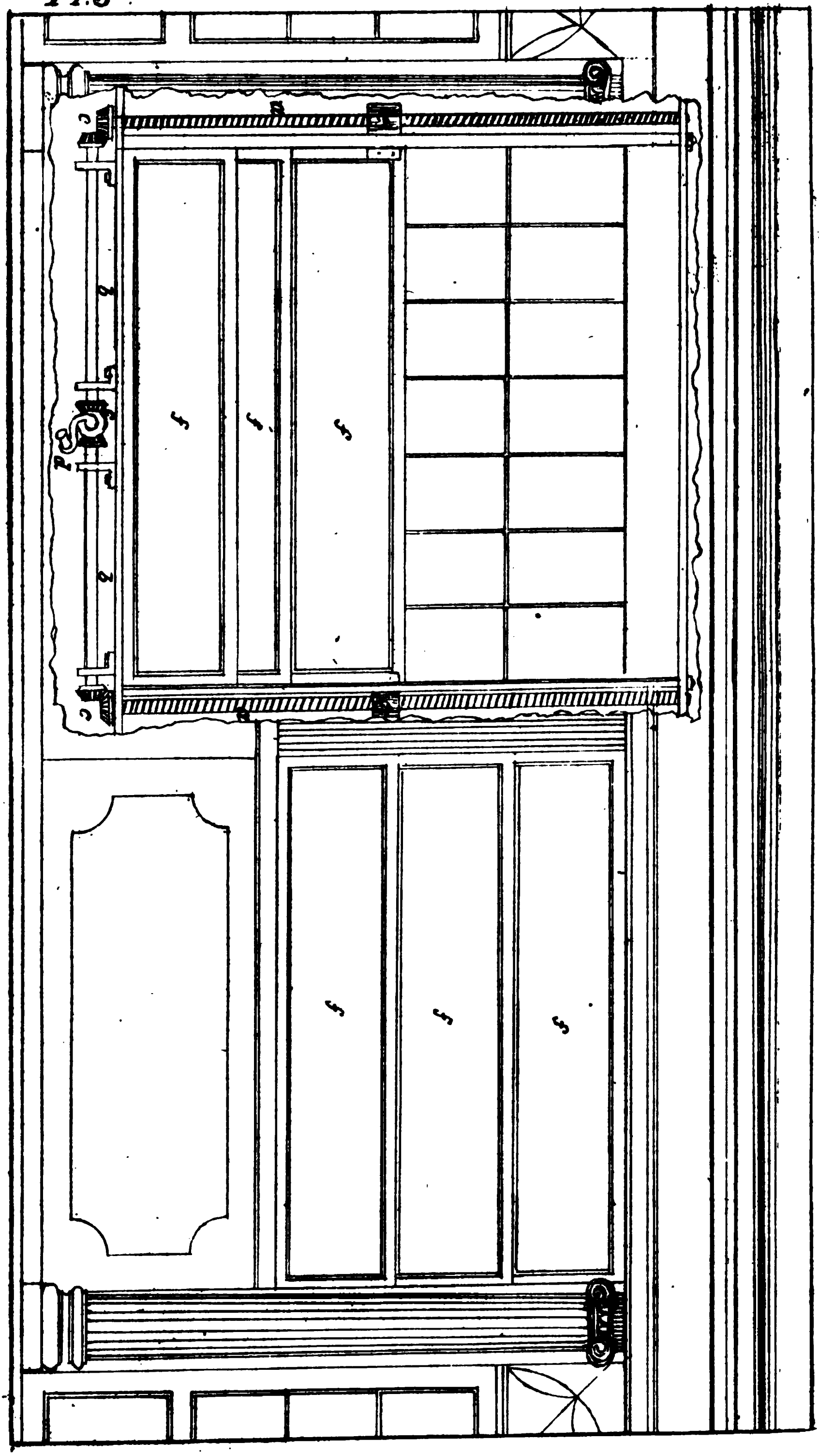

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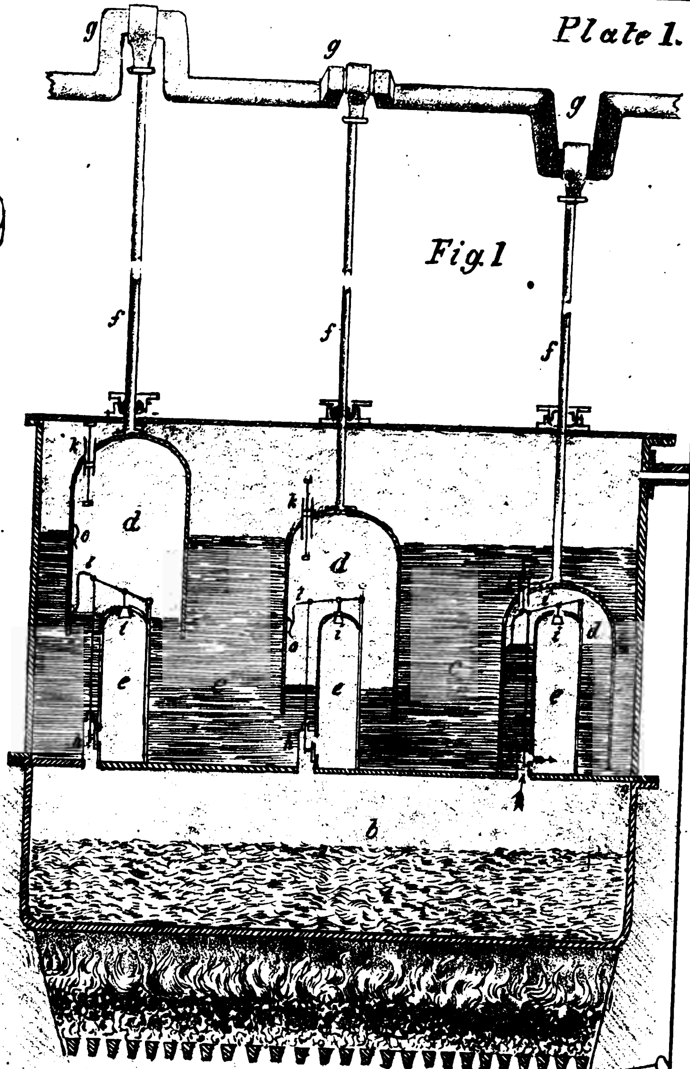

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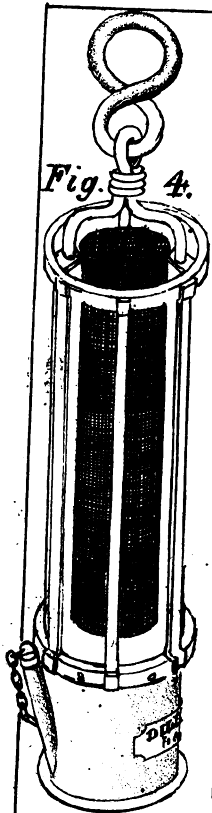

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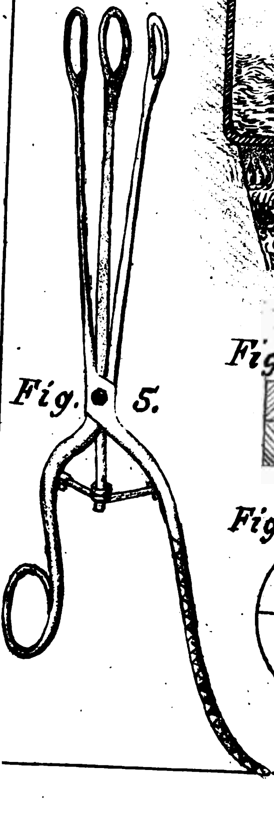

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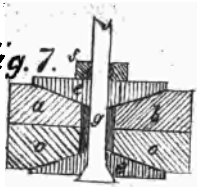

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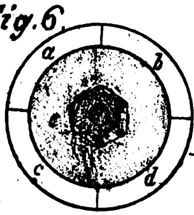

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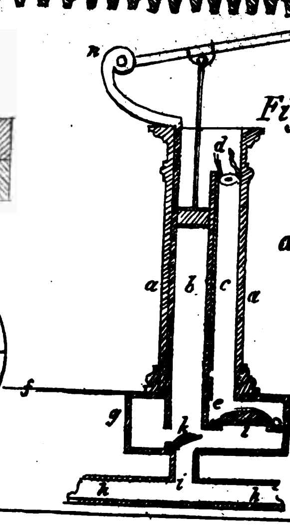

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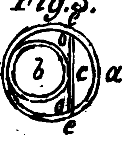

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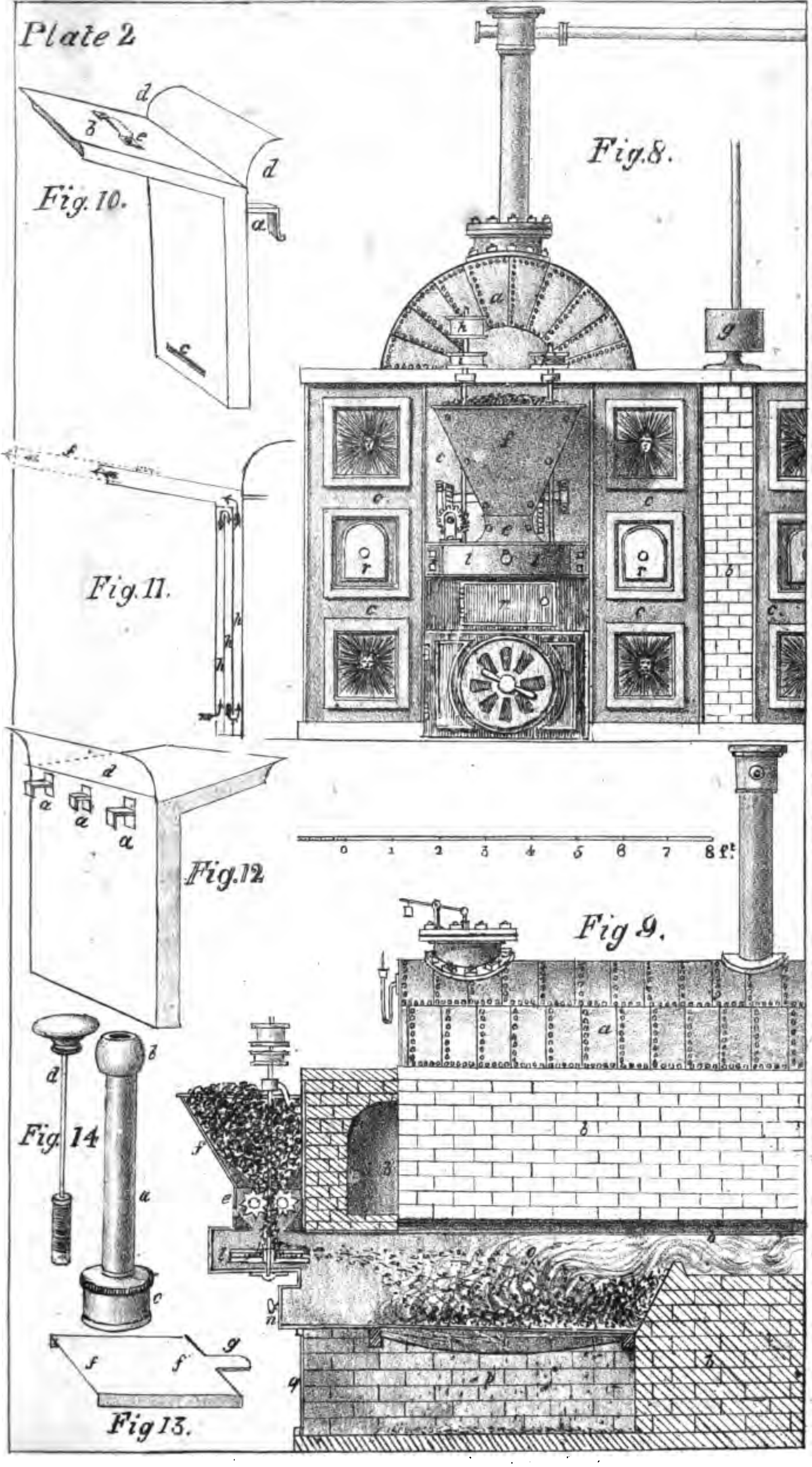
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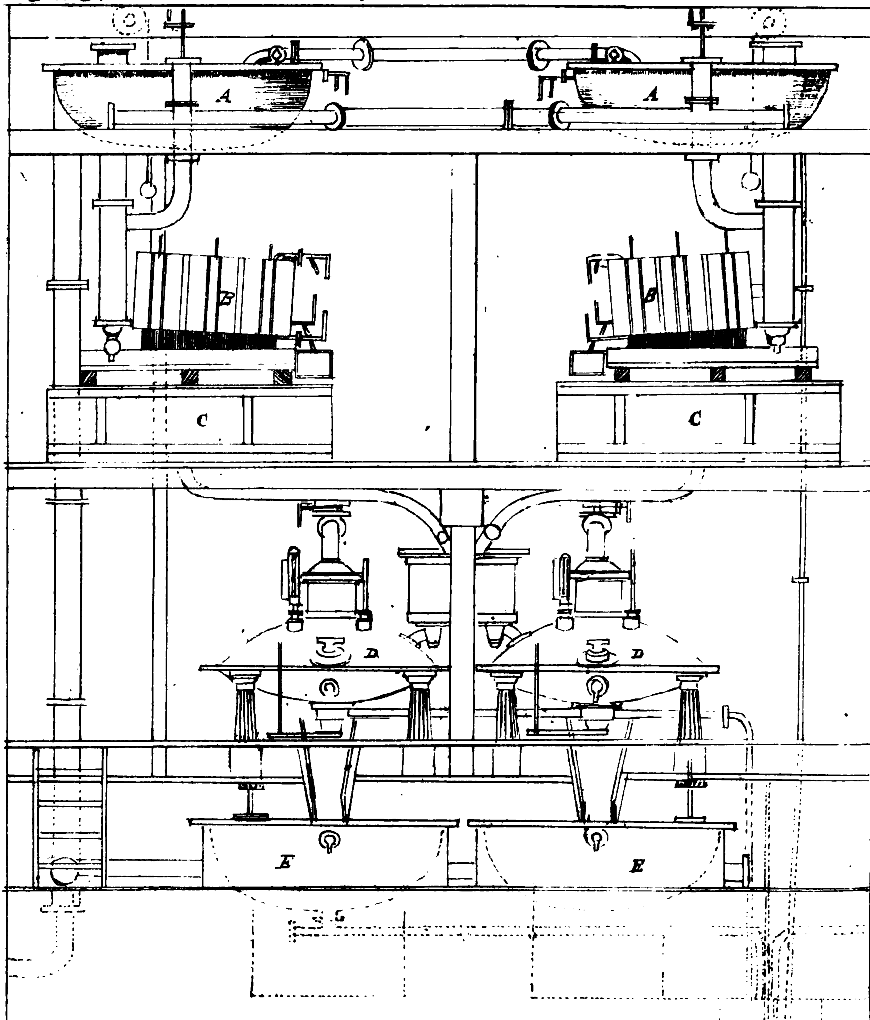

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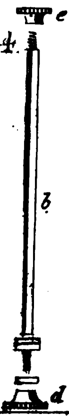

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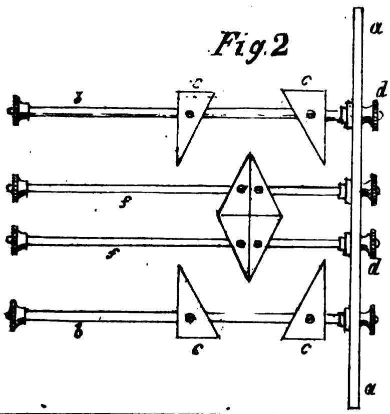

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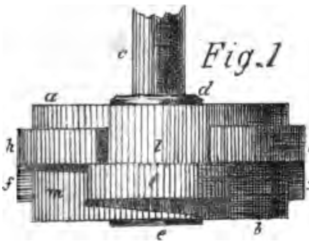

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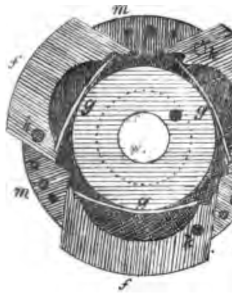

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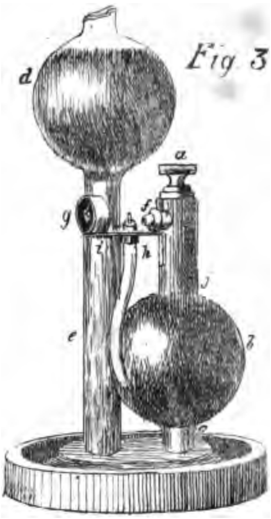

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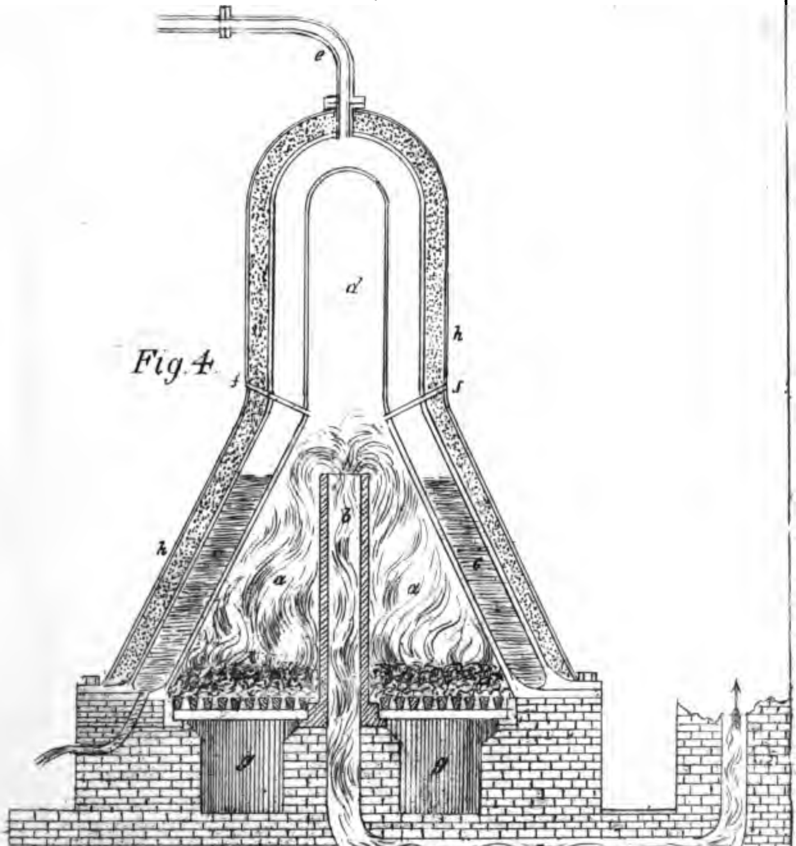

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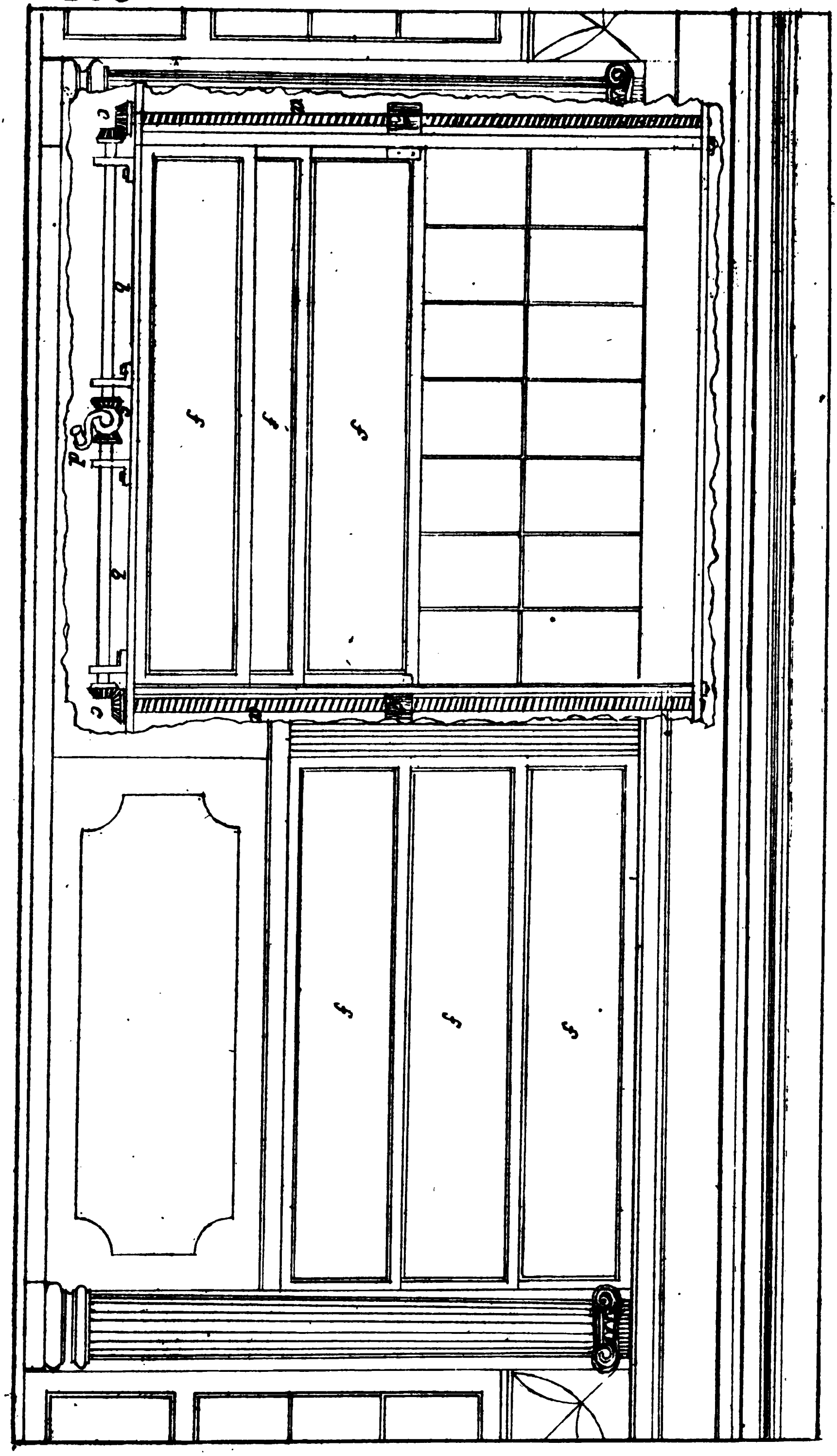

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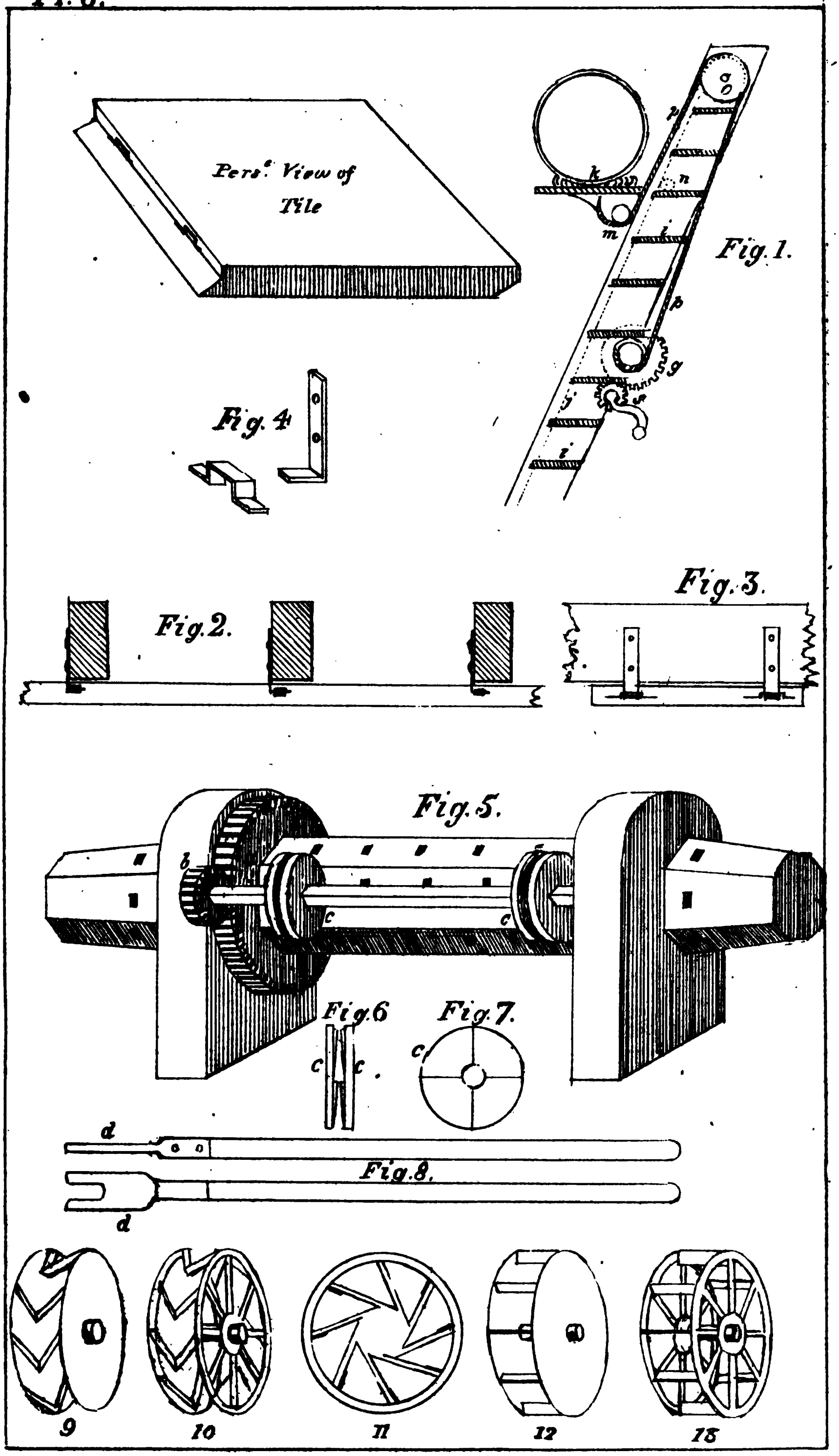
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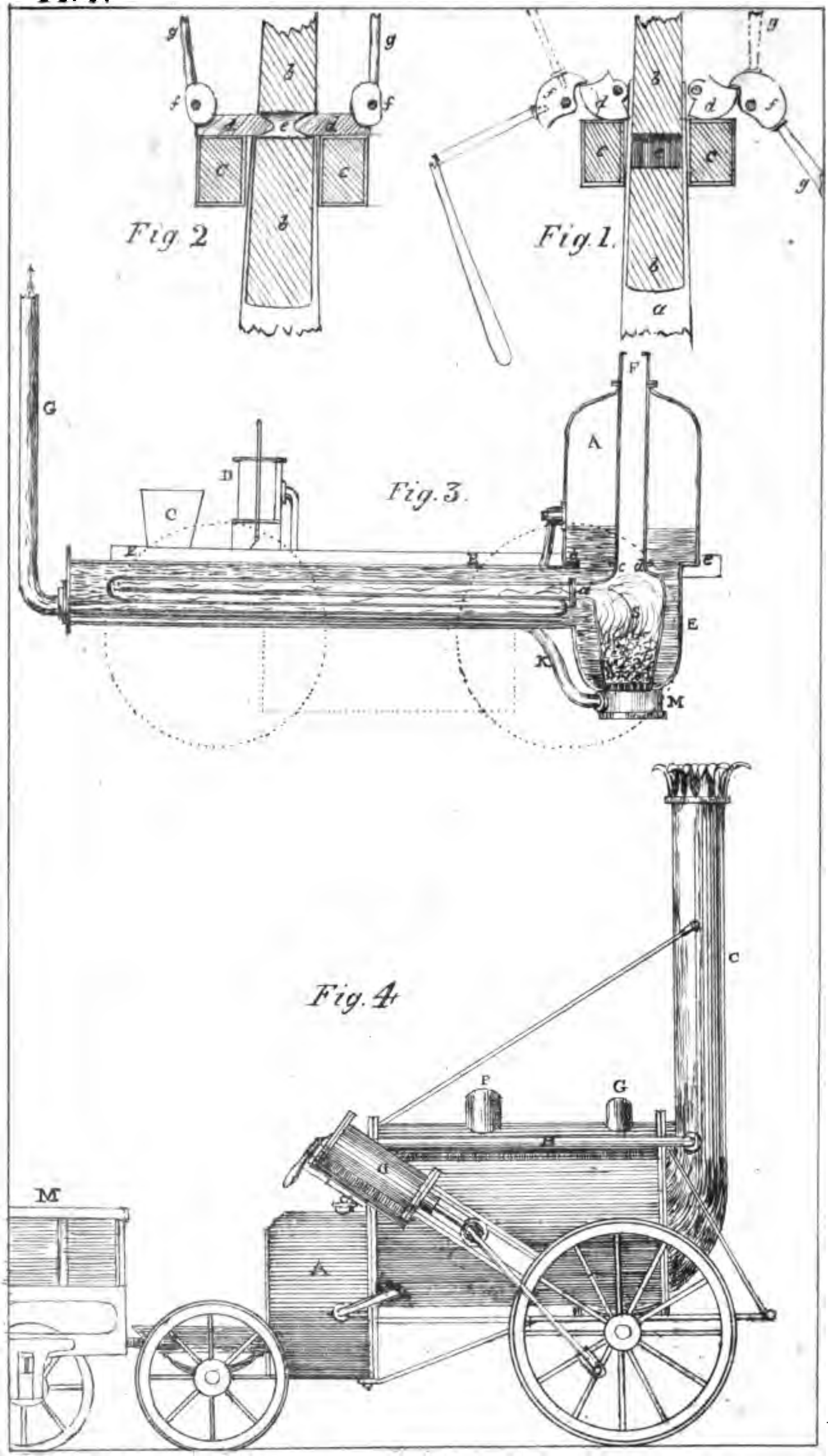

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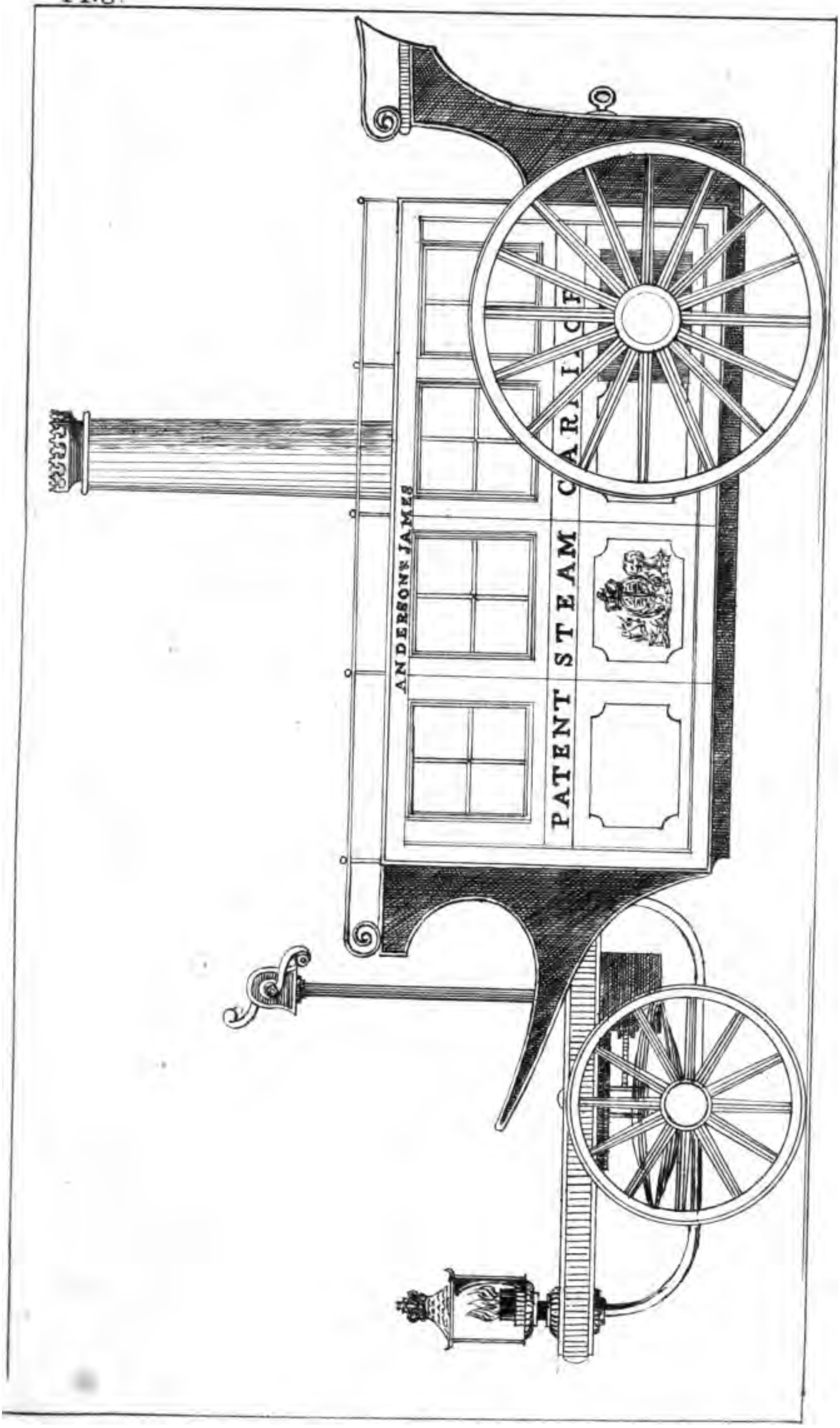

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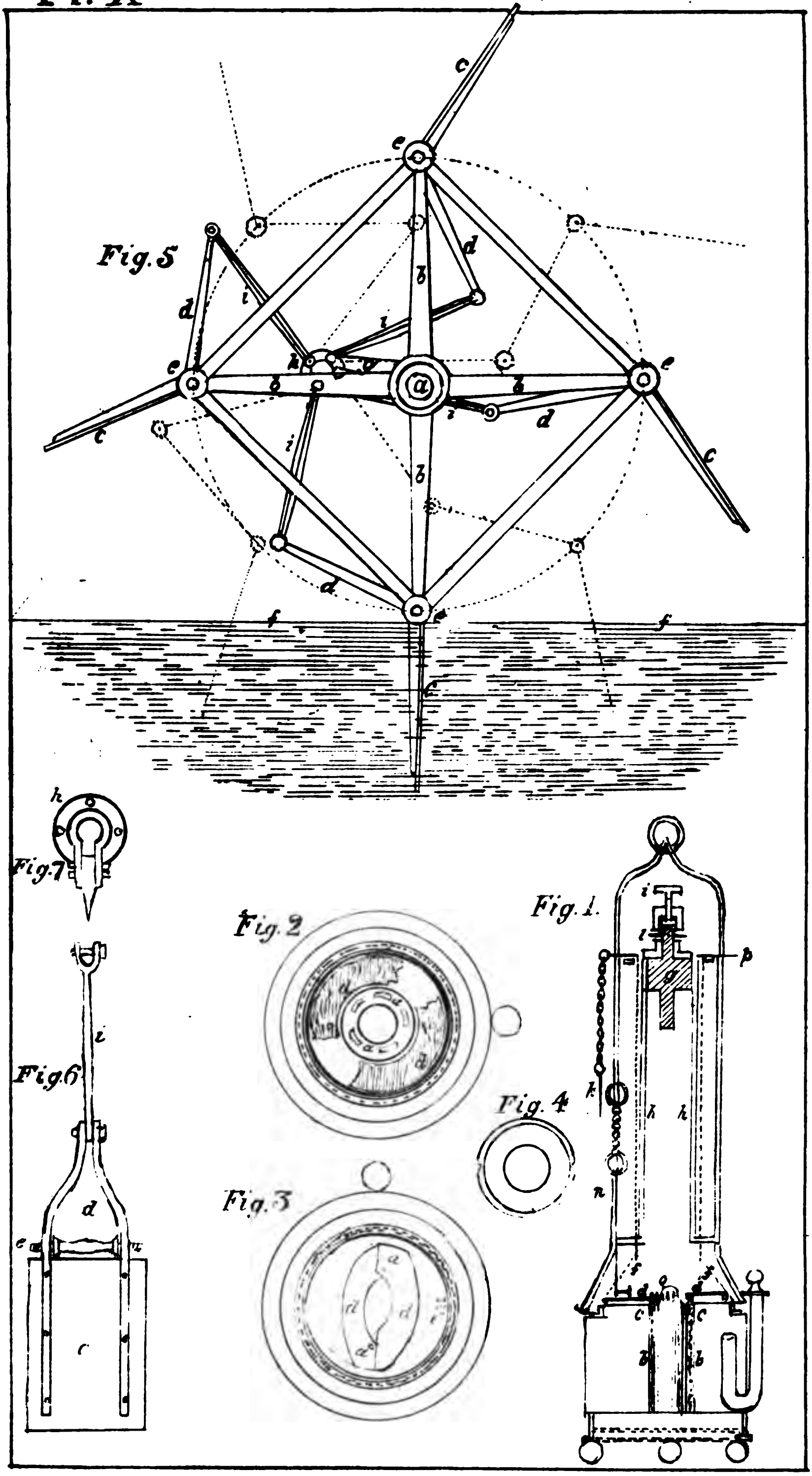

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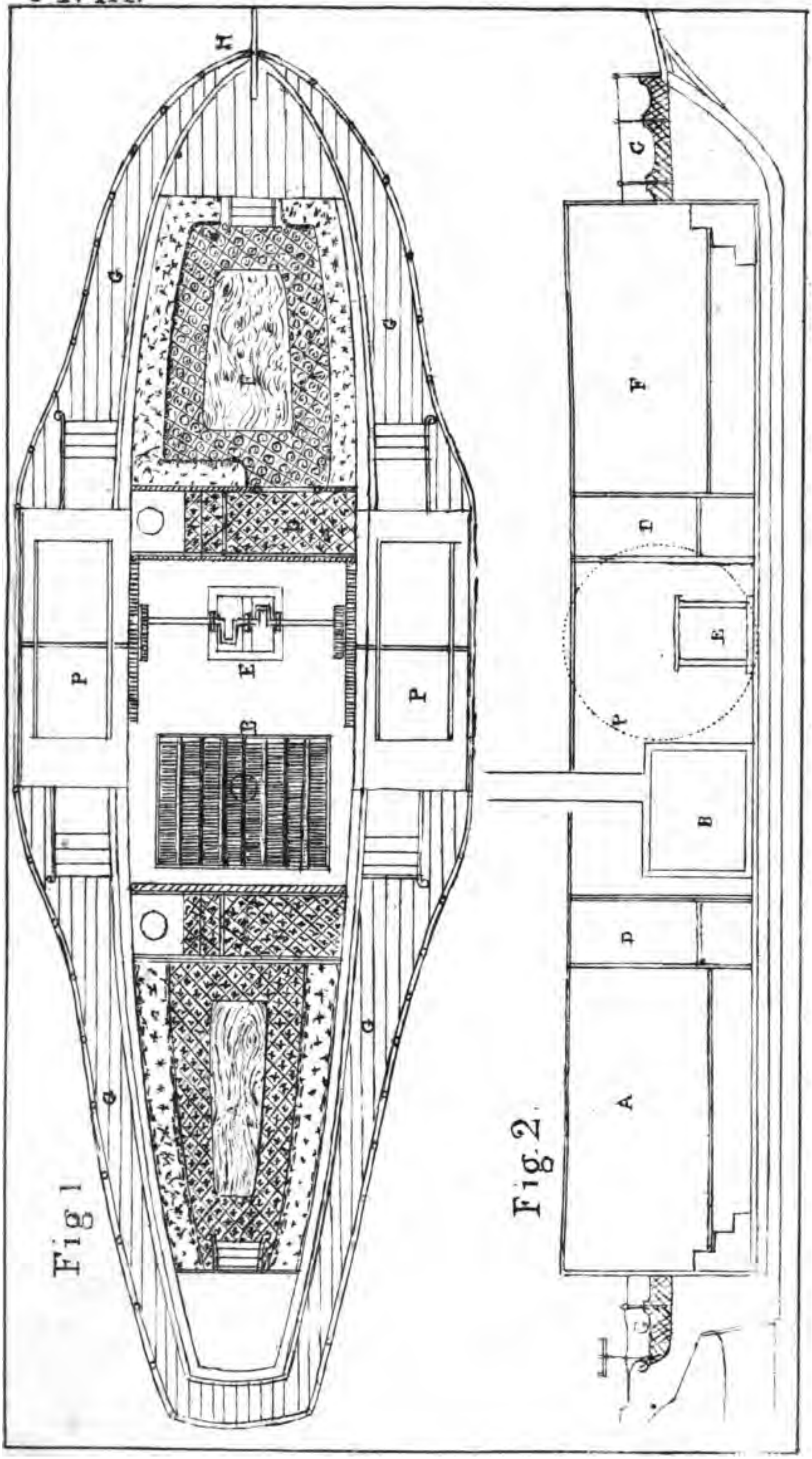

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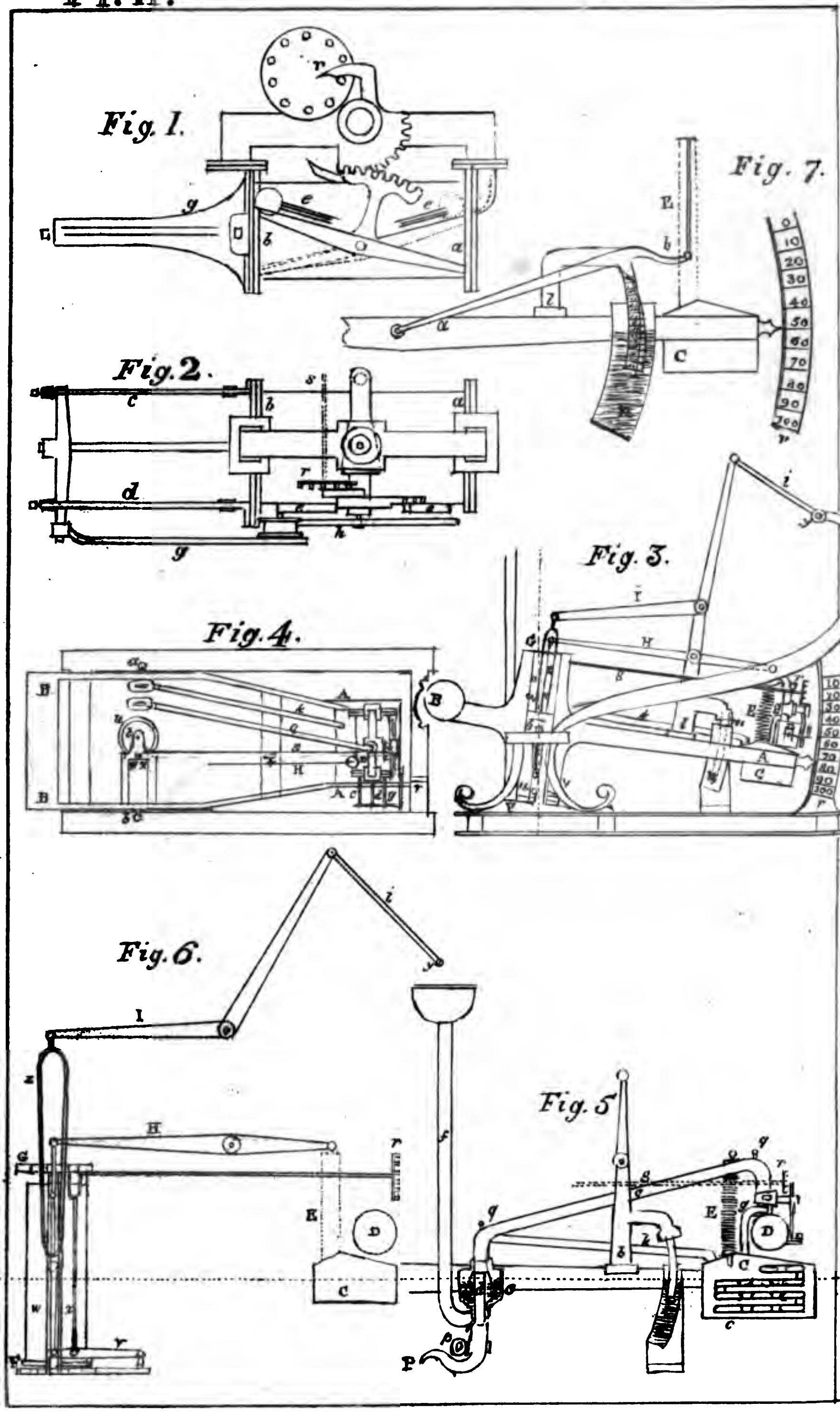

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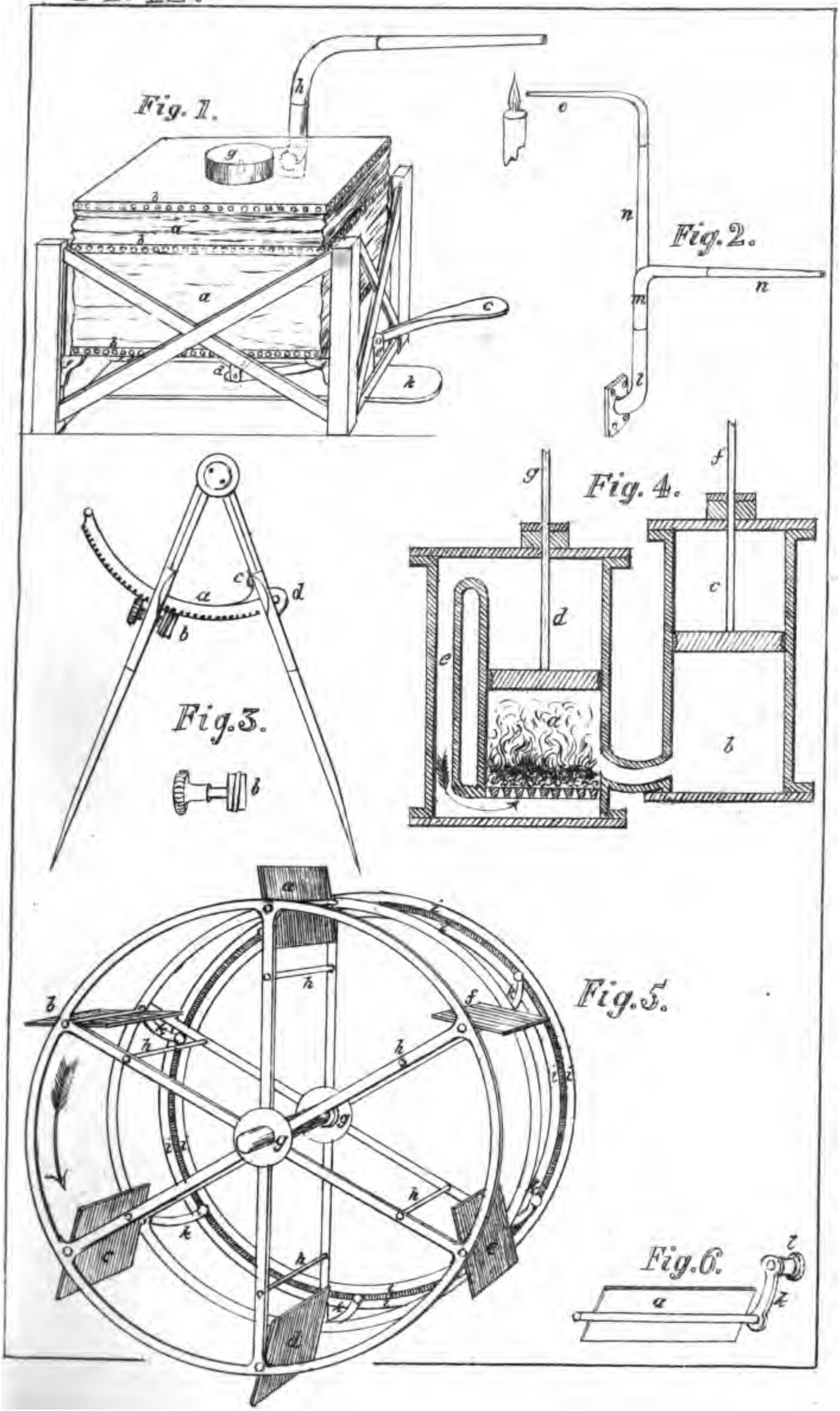


Pl. 13.

Fig. 1

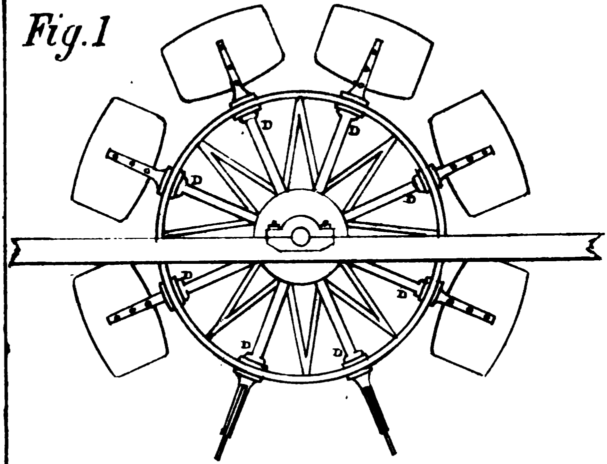


Fig. 4.

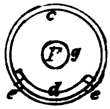


Fig. 2.

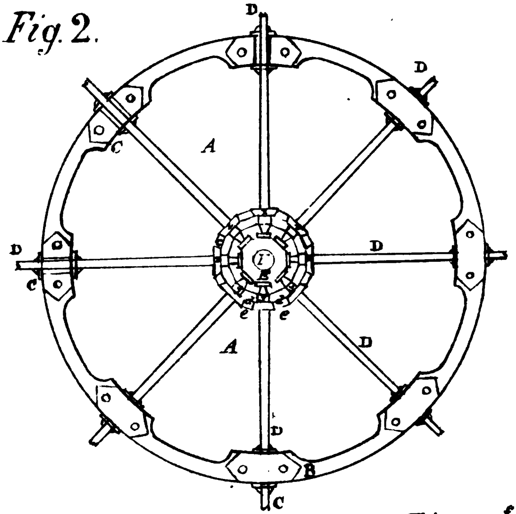


Fig 3.

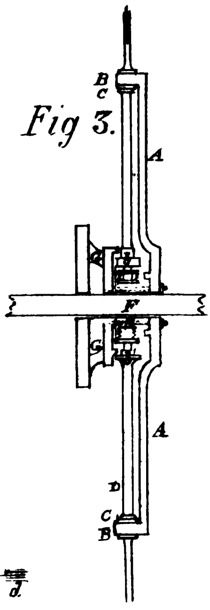


Fig. 5.

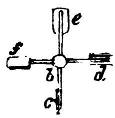
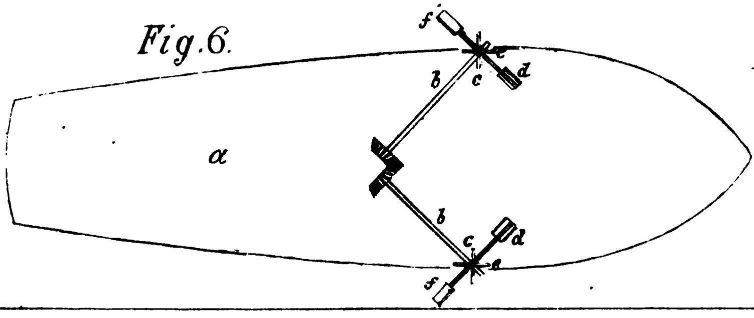


Fig. 6.



Pl. 14.

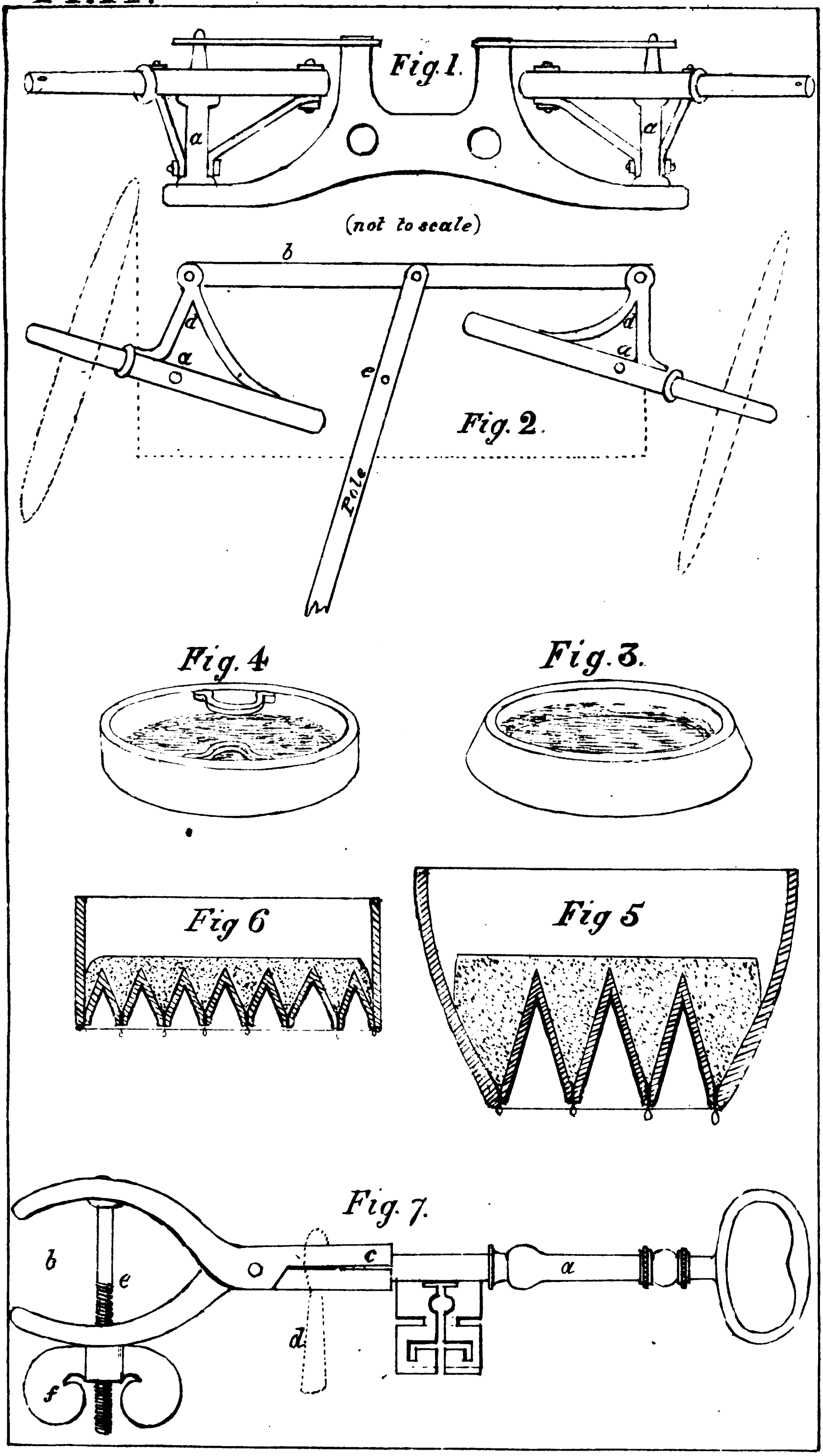


Fig. 1.
a
a
(not to scale)
b
d
a
d
a
e
Pole
Fig. 2.
Fig. 4
Fig. 3.
Fig 6
Fig 5
Fig. 7.
b
e
c
a
d
f

Pl. 15.

Fig. 1.

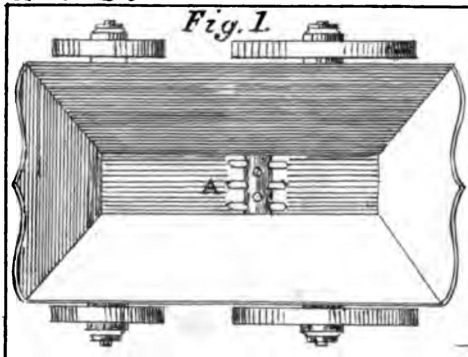


Fig. 2.

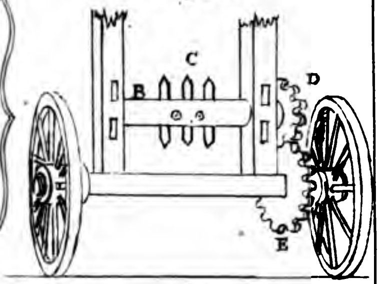


Fig. 3.

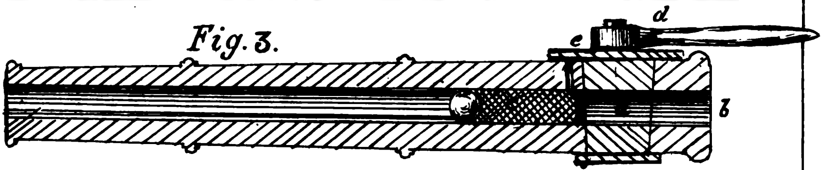


Fig. 4.

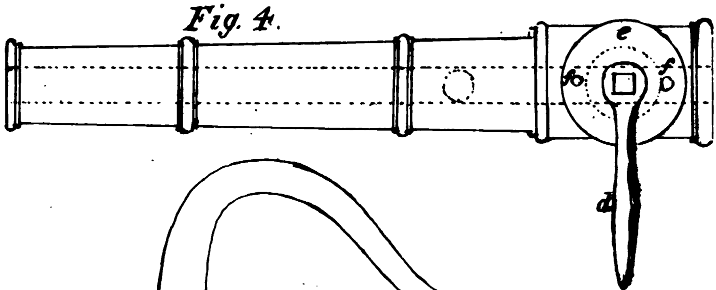


Fig. 5.

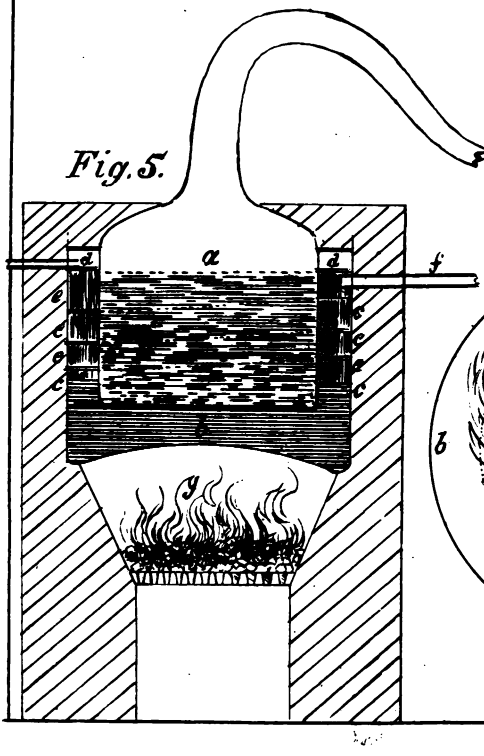
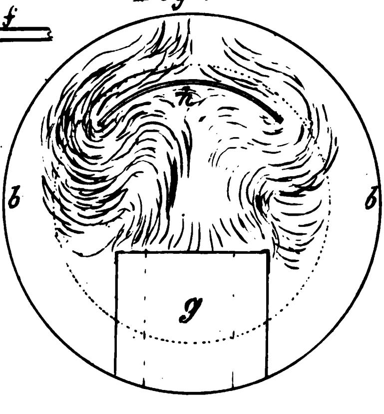
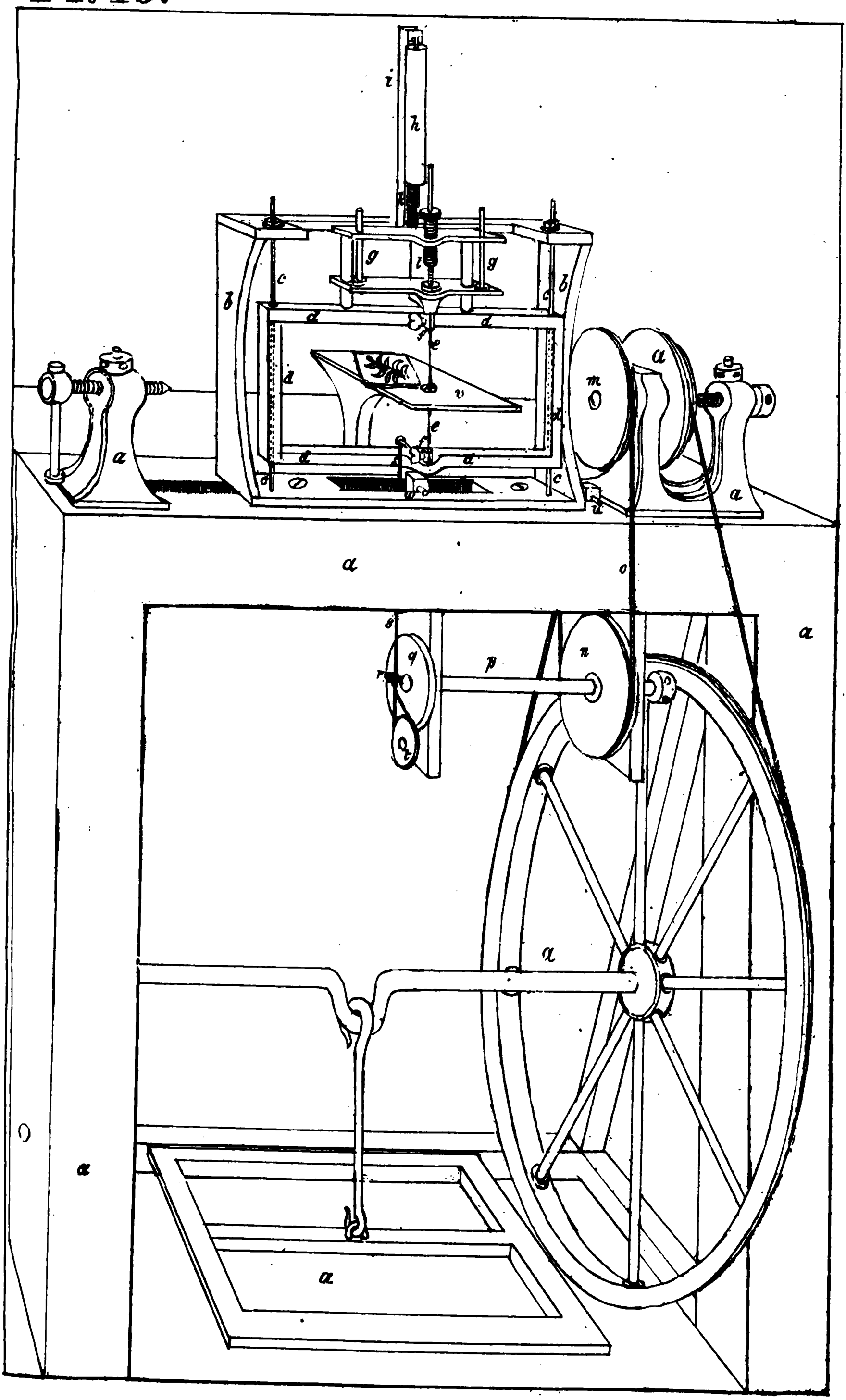


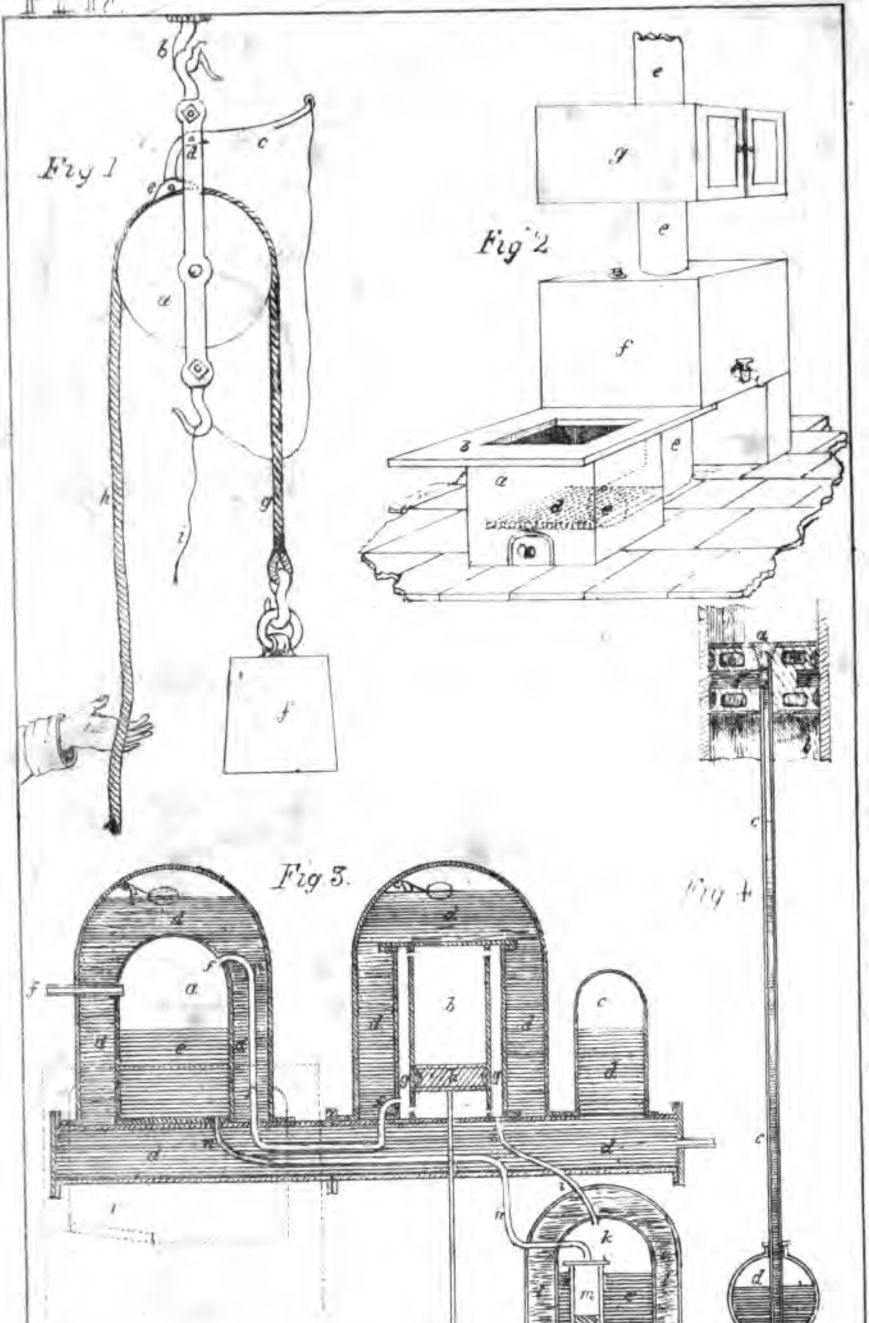
Fig. 6



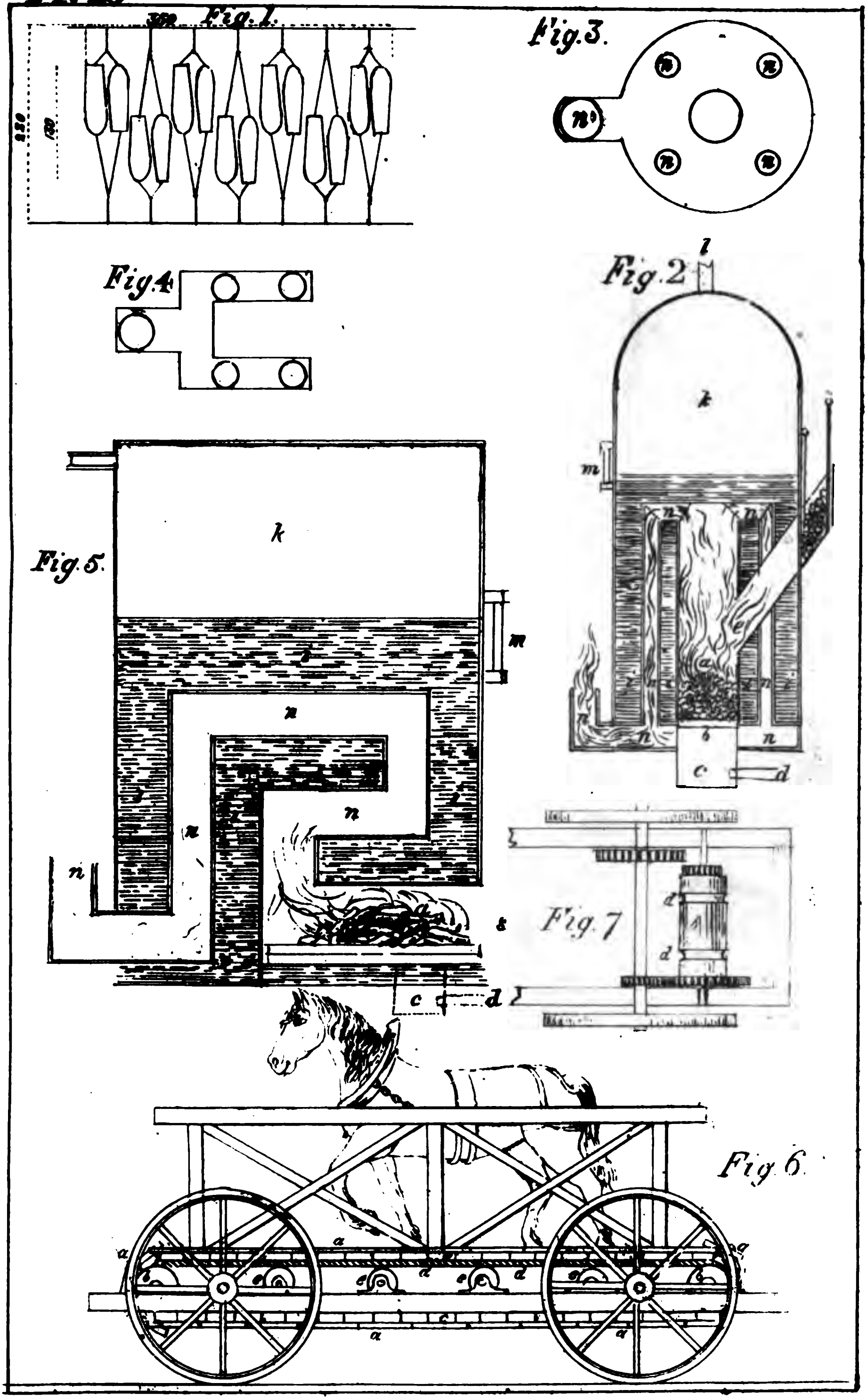
Pl. 16.



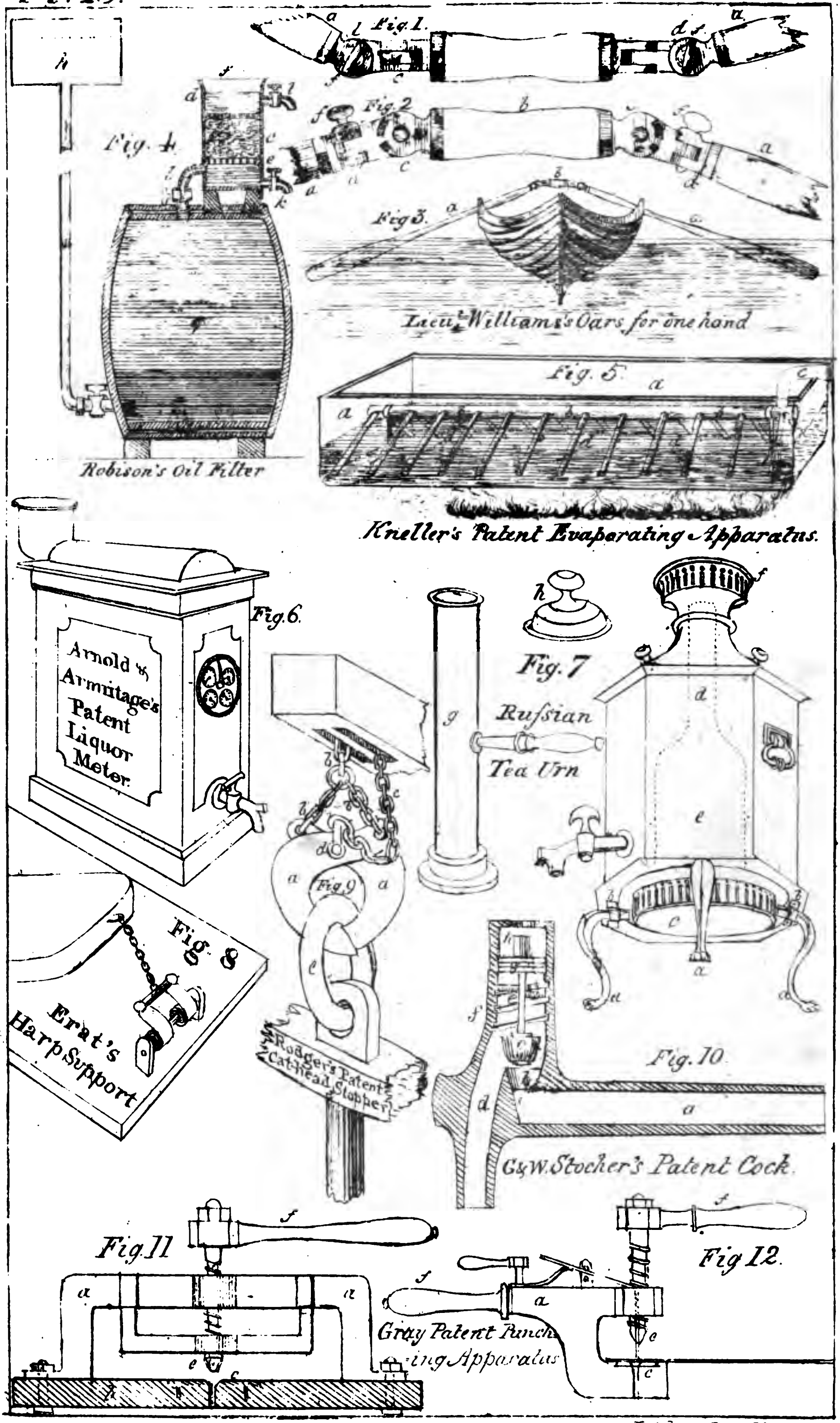
Pl. 17



Pl. 18

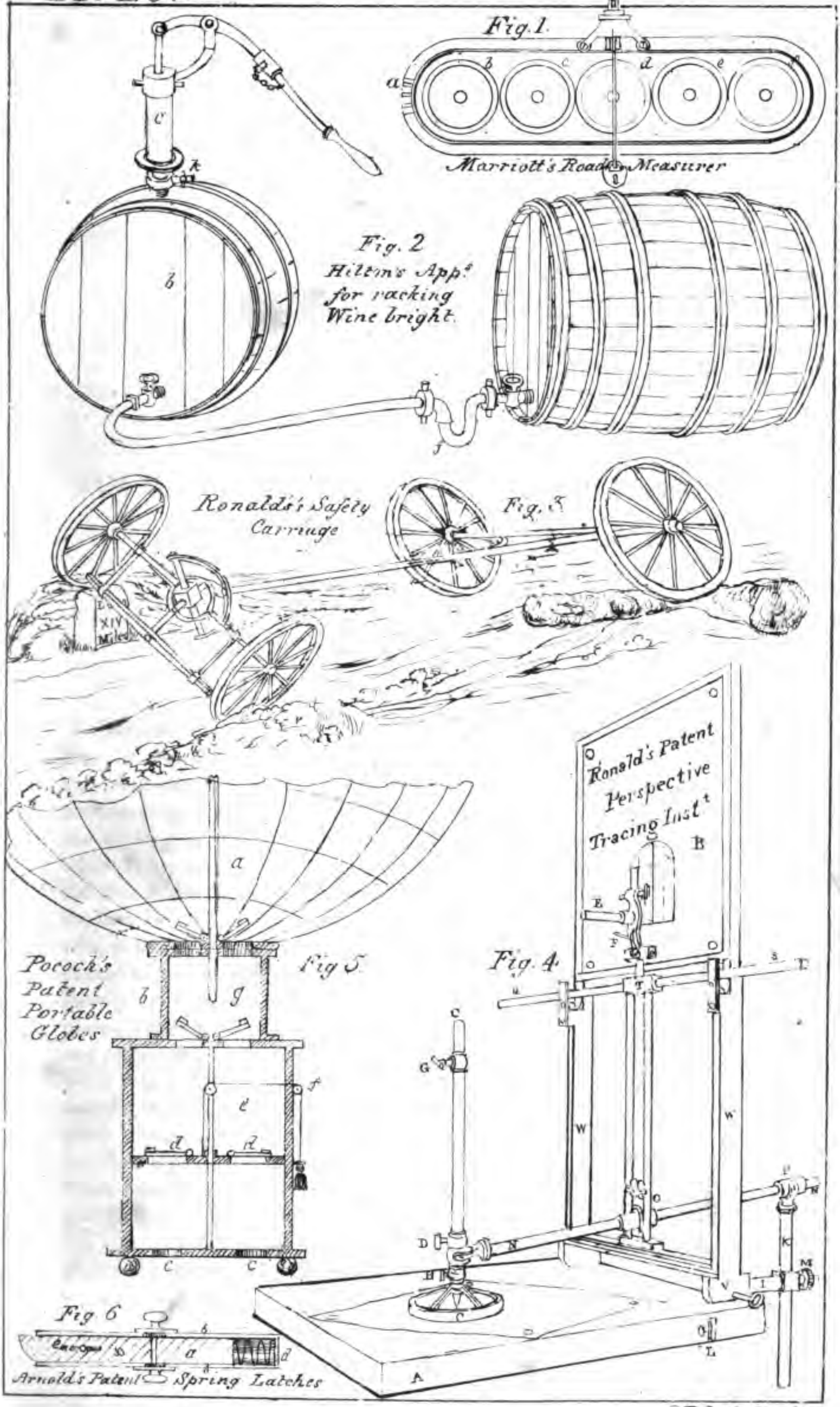


Pl. 19.



I. Hebert May 1830

Pl. 20.



L. Hebert May 1830

THE

REGISTER OF ARTS,

AND

JOURNAL OF PATENT INVENTIONS.

PATENTS RECENTLY ENROLLED.

Reciprocating Action from a Rotatory Motion.—William Parr, of the City-road, and James Bluett, of Blackwall, Middlesex, ship-joiner, have patented "a new method of producing a reciprocating action by means of a rotatory motion to be applied to the working of all kinds of pumps, or other machinery, in or to which reciprocating action is required or may be applied." Such is the title which the patentees have prefixed to their invention, which consists in two pinions placed on the same axis; so connected with it and each other by locking pins, that one of the pinions are caused to turn with the axis, while the other is permitted to run loosely upon it, and this they do alternately. These pinions are placed within a reciprocating frame, furnished with two racks, the one placed to be acted upon by the right side of one of the pinions when it is locked to the axis, and thus cause the frame to advance, and the other to be acted upon by the left side of the other pinion, while it is locked to the axis, and the first permitted to run freely, and thus cause the frame to retreat again. When the reciprocating frame has advanced to its greatest extent, it acts upon the locking geer, which releases the first, while it attaches the second pinion to the axis. It will be perceived that the rack on one side must be placed the thickness of the pinion more forward than the rack on

the other, so that each can be acted upon only by the pinion to which it belongs. The motion produced by this reciprocating machinery will be uniform throughout each stroke, which is not the case by a reciprocating motion produced through the medium of a crank, and this would be an advantage in many cases connected with the cotton and woollen manufactures; but the uniformity of motion throughout the stroke would decidedly be disadvantageous, when applied to pumps, the only instance of application mentioned by the patentees, for in them the gradual increase and decrease of motion produced by the crank at the beginning and end of each stroke becomes absolutely necessary, when the pistons, piston rods, and other reciprocating parts of the apparatus are heavy.

TABLE-FORKS AND KNIFE-SHARPENERS.—George Rogers, cutler, J. C. Hobson, merchant, and J. Brownill, cutler, all of Sheffield, Yorkshire, have patented an improvement in table-forks, by which they can be applied to sharpen table-knives. This improvement, though principally applicable to carving-forks, may be applied with advantage to other forks. It consists in attaching to the stem between the handle and the root of the prongs three or more projecting pieces of steel fixed to it by a screw pivot, passing through their centres. The edges of these steels, which are slightly fluted, to produce a filing action on the knives, are curved so as to form the same angle with each other, whether their roots or points are brought in contact to act on the knives. These projecting steels, when applied to carving-forks form a guard, and they are not much larger than the usual guard, and hence they become very convenient in use, as they are always at hand when required. This is certainly the best of the numerous knife-sharpeners on the same principle, which have recently been submitted to the public.

PROPELLING VESSELS.—Orlando Harris Williams, of North Nibley, Gloucestershire, has obtained a patent for "certain improvements in the paddles and machinery for propelling ships and other vessels on water." The patentee has two objects in view; first, to have the means of increasing or diminishing the surface of the paddles, according to the depth of the vessel in the water; and, secondly, to have the means of making them enter and leave the water edgeways. The first of these objects he proposes to accomplish by the application of the introduction of double leaves to the paddles, which are attached by bolts to projecting arms or radii from the paddle-wheel, so that one of the leaves may be shifted

beyond the other when more surface is required; and the second, by causing the paddle-arms through the medium of cams fixed upon them, and acting on projections fixed on the side of the vessel, to turn so that their broad surfaces may in succession be made to act on the water, when completely immersed in it, or during about one-sixth part of their revolution.

Propelling Vessels.—Archibald Robertson, of Liverpool, ship-carver, has taken out a patent for "certain improvements in the construction of paddles, for propelling ships, boats, or vessels on water," which consists in placing the floats or vanes on the paddle-wheels, so that they may make, with the plane in which the wheel turns, an angle, varying from forty to seventy degrees, according to the extent of paddle surface required; but he prefers, under ordinary circumstances, to place them at an angle of forty-five degrees. The exterior edge of the vanes slope back or towards the stern of the vessel on each side, and thus, though they act upon the water obliquely, the oblique action of the one will counteract that of the other, and their united tendency will be to propel the vessel right a-head. The patentee considers that the oblique position of the vanes will obviate the inconvenience and waste of power arising from the violent action of paddles of the usual construction, while entering and leaving the water.

Mr. Robertson likewise claims, in his specification, an improved method of raising and lowering at pleasure, the paddle-wheels in the water, which he proposes to accomplish by attaching them to frames, whose ends rest on centres coincident with the centre of the main shaft from the steam-engine or other moving power; and their other ends are supported by chains passing over pulleys, and supported by counterpoises, so that the paddle-wheels, which are turned by spur-wheels fixed on the main axis, taking into similar spur-wheels fixed on their own axis, may be raised or lowered with any power sufficient to overcome the friction.

Propelling Vessels.—Francis Neale, of Gloucester, barrister-at-law, has just specified his patent for "a machine, apparatus, or combination of machinery for propelling vessels," which consists in the application of hinged paddles attached to a reciprocating frame, so as to fold upwards, or assume a horizontal position when moving forwards, and fold down or assume a vertical position, by which their flat surfaces act upon the the water when moving backwards. The frame is made to traverse by a crank, acting upon a system of levers, similar to that system called the lazy tongs, with the addition of stays,

on the principle of the radius rods of the series of levers used to produce parallel motion in the pistons of steam-engines.

IRON ROOFS.—Henry Robinson Palmer, of the London Docks, engineer, has obtained a patent for "a certain improvement or improvements in the construction of warehouses, sheds, and other buildings, intended for the protection of property," which consists in the application of iron plates riveted together, and strengthened by being fluted or bent, so that the roof, when completed, will have the appearance of the common pantile roofs. The intention of the bending of the plates is to give the roof, which is to be elevated in the centre in the usual way, sufficient strength to maintain its position without the introduction of rafters; and hence the patentee obtains a roof, which is at once light, economical, and well suited to the purposes proposed.

ROTATORY STEAM-ENGINE.—Thomas Smith, of Derby, engineer, has patented "an improved piece of machinery, which being combined with parts of the steam-engine, or other engines, such as pumps, fire-engines, water-wheels, air-pumps, condensers, and blowing engines, will effect an improvement in each of them respectively." A singular title affixed by Mr. Thomas Smith to his invention, which is an engine of the rotatory kind, capable of being converted at pleasure into a steam-engine or a pump. This engine, which displays much ingenuity, differs from all other rotatory engines in its having no fixed fulcrum for the steam to act against; but it has two vanes or pistons turning upon axes, whose centres of motion are coincident with each other, and with the axis of the cylinder into which they fit steam-tight. The axes of these two vanes or pistons are connected by a train of eccentric toothed wheels, which cause them to revolve with different velocities, so that the pressure of steam between the vanes within the cylinder which causes them to separate, causes them at the same time to move, though with different velocities, for no separation of the vanes can take place with their moving, and having got to that position when the vane which was moving quickest, passes the eduction pipe, and the one which was moving slowest passes the supply pipe, situated about one-sixth of the circumference of the cylinder from the eduction pipe, the position of the wheel-work is so far changed, that the first vane then moves slowly, and the second quickly: and thus a continuous rotatory motion is produced, which may be applied to give motion to machinery, or in pumping water, if motion be communicated to the apparatus, and the supply pipe made to communicate with the water to be raised.

PATENT APPARATUS FOR THE FEEDING OF STEAM ENGINE AND OTHER FURNACES.

By John Stanley, of Back Watling Street, Manchester: (being a conclusion of the subject "*On Furnaces which consume their own Smoke*".—Continued from p. 362 of the preceding volume.)

It affords us much satisfaction to be enabled to conclude the series of articles mentioned above, by introducing to the notice of our readers a recently patented invention, which is eminently calculated for lessening the inconvenience arising from dense black smoke, and at the same time of economising to a great extent the consumption of fuel. It is true, that the majority of inventions contrived for this purpose have been stated to possess similar properties; but the merits of Mr. Stanley's apparatus do not rest upon mere profession—they have been proved in numerous instances on the large scale to the perfect satisfaction of the proprietors. We have had an opportunity of observing and investigating its application, to a large engine at the South Lambeth Water-Works, to which two 40-horse boilers are provided. Previously to the adoption of Mr. Stanley's apparatus, it was found necessary to work both these boilers at once, in order to furnish sufficient steam to do the work, and the labour of the fireman was excessive in feeding the furnaces by hand. Now, the feeding of the same boilers is performed without manual intervention, and the effect of the fire thus mechanically supplied is so much greater than before, that only one of the boilers instead of both is found fully adequate to supply the steam. The quantity of fuel used is besides so nicely regulated by the engine itself, that the instant there arises an excess of steam in the boiler the feeding apparatus ceases to work, by being thrown out of gear, and immediately the steam falls below the required pressure, the falling of the mercury puts the machinery into gear again, and the feeding recommences. The large coals are broken by the apparatus to a small size, so that ignition takes place the instant they are thrown upon the live fuel, and being constantly distributed over the whole surface of the grate, the combustion throughout is so perfect, that scarcely any smoke escapes undecomposed. Of this fact any person may easily satisfy himself by noticing the chimney of the works in question, from whence is seen uniformly issuing only a light grey vapour, containing not so much carbonaceous matter as is commonly given off from a kitchen fire. Thus are the public benefitted by the annihilation of a nuisance, and the proprietors of the apparatus derive the advantage of considerable saving in expenditure for fuel. We cannot venture to repeat what

was told us with respect to the latter point: suffice it to state, that we were informed that the patentee *guarantees* that the quantity of fuel required to produce a given effect shall be twenty-one per cent. less by his mechanical mode of feeding than when performed by hand.

The cost of the apparatus is very trifling when compared to Brunton's Revolving Grate; it is far more convenient and compact, and does not require a supplementary boiler. Stanley's is applicable to any ordinary furnace; it is fixed in front, forming a convenient appendage, and a very neat and handsome finish to the structure. Such are the facilities for fixing, that we were told by Mr. Thomas Thomas, the engineer, of Holland Street, Blackfriars, (who is the manufacturer and patentee's agent for London,) that he would undertake to fix the apparatus even to a 100-horse engine between Saturday night and the succeeding Monday morning, so that not a minute should be lost by the stopping of the work during the usual hours of business. We may also remark, that in an engine having only one boiler, the furnace of which is supplied by this apparatus, any repairs can be made to the latter without stopping the work, as the furnaces can during that operation be fed by hand through the fire-door as usual There is, however, so little liability to derangement in this feeding apparatus, that the patentee undertakes *to keep it in repair* for about two per cent. per annum; and with respect to the wear of the boiler and furnace, we were informed by the engineer, at the water-works before mentioned, that they would last full double the usual time. A little reflection upon the effect of the frequent changes of temperature occasioned by the opening of the fire-door, and the poking and scraping with the stoker's iron tools, would lead us, independently of any statement of the kind, to the same conclusion. It is scarcely necessary to add, after the foregoing observations, that this apparatus will keep the steam uniformly at any required density.

Fig. 8, Plate II., represents a front elevation of one of the boilers before mentioned with the patent apparatus applied, and likewise a portion of the second, the whole of the latter not being brought into view on account of its similarity to the other. Fig. 9 represents a side view of a part of the boiler, and a longitudinal section of the furnace and feeding apparatus, the scale of feet between these figures giving the dimensions of the parts. The letters of reference in each of the figures indicate similar parts.

a a are the boilers; *b b* the brickwork and flues surrounding them; *c c c c* are plates of cast-iron pannelled, and forming a handsome front to the apparatus whereto all the apparatus is fixed, so that it can be easily attached to any boiler; *f f* is the hopper, con-

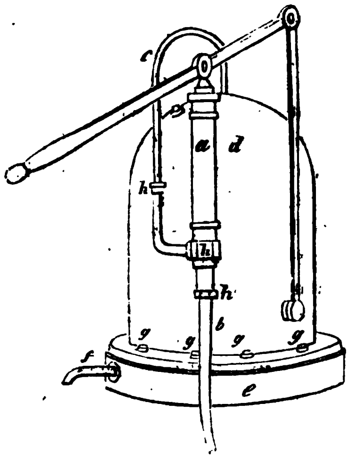
taining sufficient coals for an hour or two's consumption; at *e e* are grooved rollers for breaking the coals as they fall between them from the hopper above; they are put in motion by straps from the engine embracing the pulleys *g h i k*, and the revolution of the shaft of the pulleys *h i* actuates some small gear which cause two fanners to revolve with rapidity over two circular iron plates which project the coals over the grate; only one of these fanners is necessarily shown in the section at *l*, but the situation of both is indicated in the front elevation by the two letters *l l*; *n n* is the fire-door; *o* the fire; *p* the ash-pit, which is provided with a ventilating plate *q* to regulate the admission of air whenever desirable; *r r* are doors covering openings into the side flues.

PATENT FILTERING MACHINE.

By R. Wiss and Co., of Fleet Street.

We have a letter before us, signed "A Country Farmer," expressing a desire to see a description of the above invention in the Register, as he conceives it to possess the extraordinary powers which are set forth in the printed prospectus issued by the patentees. This little apparatus, which occupies something less than a cubic foot of space, our correspondent repeats, will filter 2000 gallons of water per day, and therefore "will become a most useful article in those farms which have ditch and pond water, full of frogs, toads, efts, spine-worms, spawn that breed the hair-worm in calves' lungs, in the disorder called the *fan fog*; also, in preventing the *red water* in cattle, which is occasioned by their drinking water containing small animalcules, bred from the weeds in those ditches and foul waters, &c. &c.," and, consequently, that "*by using this machine* a great many beasts might be brought to market that are now lost by drinking impure water." The writer concludes his epistle, by informing us that he has purchased one of Mr. Brown's filterers, owing to its having been described in favourable terms in an early number of the Register, which he finds to answer his purpose well; but, as Wiss's machine will filter such a vastly greater quantity, he is anxious that the public and the cattle should derive all the benefit, and the republics of frogs, toads, efts, &c., should receive all the injury which the "Royal Patent Mechanical Filterer" can inflict.

As believers in transubstantiation, we are not a little apprehensive in introducing this machine to our readers; but here it is represented in the subjoined cut.



a is a force pump; *b* a suction pipe, to be inserted in a pail or other vessel of water; *c* the pipe which conducts the water out of the pump into the top of the vessel *d*; *e* is a receiver for the purified water; *f* a cock to draw the water off; *g g g g* screws for separating the receiver from the vessel *d* when required.

That this machine is convenient for its portability, and from the rapidity with which *small quantities* of water may be filtered, we are ready to admit, and it is so far deserving of public patronage; but to suppose that a 9-*inch cylinder* (the size quoted by the patentees) will filter 2000 *gallons* of water "from the *mass* of corrupted and putrescent animal and vegetable matter, with which it comes impregnated into our houses," is so gross an untruth, that it deserves to be noticed.

The filtering substances used in this apparatus are of the same description as those used in others. The upper portion of the filterer, down to about the bottom of the letter *d* in the cut, is left vacant for the dirty water, which first passes through a thin bed of charcoal; the rest of the vessel downwards, which is about three-fourths of the whole, is occupied with sand, excepting a few layers of flannel at the bottom, which lie over a perforated metal plate. The difference in the process from that of others, consists in the water being forced, instead of being allowed to percolate quietly, through the sand, &c. Filtering by the constant pressure of a column of water has long been practised; and if force be desirable, it must be preferable to the intermitting action of a force pump, which has a greater tendency to dislodge the impurities that had been previously

detained, and is very well calculated to send out the water charged with more frogs, toads, efts, &c., than it had previously.

If we suppose the delectable water mentioned by the patentee to contain only a thousandth part of foreign matter, the interstices between the particles of sand in his machine would be filled before a hundred gallons had passed through, and the machine would be rendered worse than useless until cleansed.

PAPER MANUFACTURE.

John Dickinson, of Nash Mills, Hertfordshire, paper manufacturer, has taken out a patent for a "new improvement in the method of manufacturing paper by machinery, and also a new method of cutting paper, or other materials, into single sheets or pieces, by means of machinery." Mr. Dickinson, who is the inventor of patent machinery, which have been in use for some time, in the manufacture of paper in continuous sheets or webs, describes in his present specification three improvements. First, to cause the paper to be pressed between two rollers, the upper of which is heated by steam in the usual way, first with one side, and afterwards with the other upwards, to give it an equal gloss on both sides; secondly, to introduce, during the manufacture, into the centre of the paper threads, fine net or other reticulated material; and, thirdly, to cut it into a sheet of appropriate size, by a more convenient and expeditious method than those now in use. The first object he effects by carrying the paper upon felt round a series of rollers, similar to those employed in the double machines for printing both sides of a sheet of paper at one time. The second, by placing over the pulp vessel a series of bobbins with thread or a roller, with any other material to be introduced into the paper. These threads are guided by a grooved roller into the pulp close to the first or feeding roller, which takes up the pulp to form the paper; and by the current of the pulp approaching the feeding roller, the threads are brought into contact with it. The third improvement he effects by affixing to the bottom of a tall oscillating frame, a series of circular revolving cutters; and when this frame is made to oscillate, and the cutters to revolve, they traverse along the edge of stationary cutters, on which the paper to be cut is extended, and thus all the advantages of a clipping action is obtained.

WINDMILLS.

Church Mewes, of Manchester, engineer, has obtained a patent for "various improvements in the form and construction of

windmills and their sails." The first improvement described by the patentee is an arrangement for varying the relative speed of the mill-stones, and the sails, to obtain the same speed in the stones with different forces of wind; which he effects by fixing on the same shaft a series of spur-wheels of different sizes, the largest being nearest the end of the shaft. These wheels are acted upon by a spur-wheel on a shaft placed parallel to the last, and connected by bevel wheels with the main sails, or first mover of the machinery. The different sized wheels are brought into contact with the driving wheel, as required by the frame which supports them being connected to the frame which supports the driving-wheel by rods, which act in a manner precisely similar to the action of the rods, which connect the two sides of a common parallel rule; thus, while the shaft, with the different sized spur-wheels, is carried forward, it is also brought nearer to the driver, so that a wheel of a smaller diameter is brought into gear with it. The second improvement, which Mr. Mewes describes, is to render the helm sails by which the main sails are adjusted to face the wind, more susceptible of the action of slight winds, and this he effects by connecting a large vane with their axes, through a series of levers, so arranged that the slightest turn of the vane will bring the helm sails to face the wind, and thus cause them to be acted on by a much lighter wind than what is required to act on helm sails without a vane. His third improvement applies to the main sails, the whips or arms of which he arranges so as to present to the wind an equal quantity of surface, though they are much shorter than those usually employed. He increases the number of the whips or arms, which are not made to radiate from the centre, but to proceed from points at some distance from it; the front arm proceeding in one direction, and the back arm in another, so as to give the required angle to the sail. These sails being much shorter, can be made much lighter than sails of the usual construction; and hence the top or moveable part of the mill can be made considerably smaller, a circumstance of very great importance.

IMPROVED MUSICAL GLASSES.

By Mr. Tait, of Jermyn Street, St. James's.

The musical glasses exceed every other instrument in the production of a soft, clear, and liquid quality of tone, and is peculiarly effective in the performance of pathetic music. It has heretofore been considered a desideratum that an instrument formed of glasses might be so constructed as to accord with, and accompany other instruments; to be tuned agreeably to concert pitch, with the capa-

bility of modifying in all the keys of the chromatic scale, which would tend to their being brought into general use. This arrangement we are happy to state has been completely accomplished by the talent and industry of Mr. Tait, and he has contrived to render it highly convenient to play upon, as well as an elegant piece of furniture.

The inconvenience attending the former plan of tuning the glasses by water, is completely obviated by grinding their surfaces. In this tedious operation, nothing but the exercise of that perseverance, which is the characteristic of true genius, would ever have obtained the admirable result of perfecting by such means every note. We understand that a single turn of the lathe often entirely changed the tone, which no subsequent grinding of the glass would recover: the labour therefore in bringing this instrument to perfection, in a scientific sense, may well be conceived. Every glass produces one particular definite tone, which is not liable to change (as was the case when water was used, occasioned by evaporation), but the note which it denotes is permanent.

The subjoined engravings will convey an idea of the appearance of the instrument independently of the ornament with which they are more or less decked.

Fig 1.

2.

Fig. 1 represents a perspective view of the instrument, in the form of a card-table, one of the leaves of which are inclined when open for the reception of the music-book, and likewise serves to enclose the instrument when not in use. The plane on which the glasses are placed is not quite horizontal, but slanting a little, like a writing-desk, which gives increased facility to the range of the player.

The compass of Mr. Tait's instrument is two octaves and a half, commencing, as will be seen by the annexed scale, with the *c*, the first ledger line under the treble cleff, which is usually the compass of a female voice.

It will therefore be apparent to those who play on other instruments, that written music can be performed with the same precision in this improved instrument as on the piano-forte, and that it does not, as heretofore, depend upon the ear alone, as the following example of "The Swiss Boy" will illustrate.

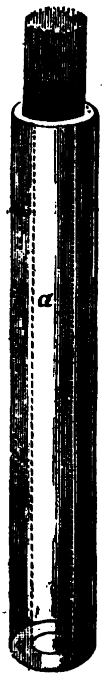
We should not omit to notice that the musical glasses, by having all the semi-tones (or flats and sharps), may be played in any key, and that the art is very soon acquired.

ON AN ARGAND CANDLE.

BY THE EDITOR.

As the matter burned by the flame of a tallow or wax candle is nearly the same as that issuing from an oil or gas lamp, namely, carburetted hydrogen; it has often occurred to us, that if candles were formed upon the same principle, as the argand burners of lamps are constructed, a light would be obtained from them, of as great intensity and purity as that derived from gas. To ascertain the correctness of our views, about four or five years ago we formed, in a coarse manner, a hollow tallow candle, the wick of which was one of the common tubular kind, used in argand oil lamps. The result of the experiment was as successful as could be expected from the imperfect nature of the manufacture. The flame was a brilliant

white, and the combustion of the wick so perfect, that no snuffing was found to be necessary. An inconvenience arose from the gutter-ing of the candle; but this defect, we conceive, would very likely be obviated by proper attention in the manufacture, and by the admixture of some other oleaginous matter, whose melting point is higher than that of tallow, as to render it harder. There are, doubtless, various substances which would be preferable to tallow for this purpose, if the price of them were not an obstacle.



a

With the intention of communicating our proposition, to make hollow candles, to our readers, we had the annexed cut executed three or four years ago; but before we could give it insertion, a patent was taken out for it by Mr. Poole, as agent for Mons. Gay Lussac, the celebrated French chemist, a report of which patent was given in Vol. III, First Series, page 274. At this time we mentioned to some friends, how we had been forestalled in our invention, when we learned, to our surprise, that several of our acquaintances had also entertained the same proposition, each imagining himself to be the sole inventor. The subject was dropped by us, and almost forgotten, until recently, when we were informed by a medical gentleman, that he had patented the invention fourteen years ago, and that a large manufactory was commenced for the manufacture of them, with every probability of success; and that the reason why the manufacture of them was not carried forward, had no reference to the practicability of the scheme. Seeing that the subject has been taken up by the most scientific, as well as by clever practical men, we are the more confirmed in our opinion, that important results may yet flow from prosecuting the plan; and with the hope that some intelligent person will undertake it, we have thrown out the foregoing remarks.

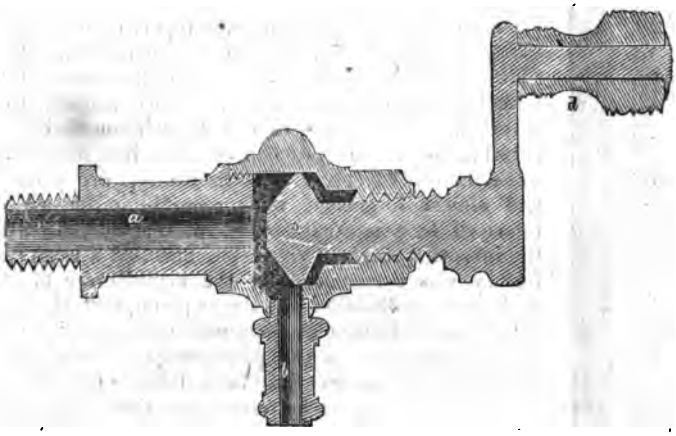
IMPROVED PREPARATION OF CANDLES.

Steep the cotton wick in lime water, in which is dissolved a considerable quantity of the nitrate of potassa; chlorate of potassa answers still better, but is too expensive for common practice. By this means is obtained a purer flame, and a superior light; a more perfect combustion is insured; snuffing is rendered nearly as superfluous as in wax candles; and the candles, thus treated, do not run. The wicks should be thoroughly dry, before the tallow is put to them.—*Murray—Brewster's Journal.*

IMPROVED LIQUOR COCK.

London Street, Greenwich, June 27, 1829.

Sir,—A salt-water friend of mine, who is what they call a "genus," having constructed a new liquor cock, which I take to be an improvement upon the ordinary kind, I have thought it a fit subject for your publication, which I have taken in from its commencement, for the sake of the nautical improvements it occasionally contains, and only wish it had a few more. As I have no relish for spinning a long yarn of description, and am a bit of a draftsman, though no fresh-water fish, I send you what I suppose to be a section of the thing.



a, is the channel where the liquor goes out; *b* the passage where it goes out into my brown jug; *c* a plug, which by turning the handle *d*, stops up the gangway, and keeps all tight. If you want to know more about it, you may see it in operation in my barley-wine cask, and at the same time, ascertain the merits of the latter.

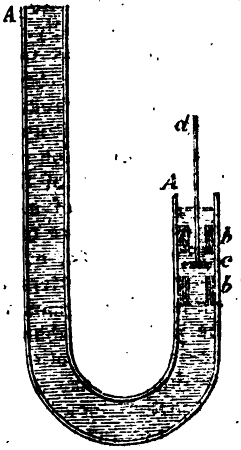
Yours, &c,

John Holmes.

ASH'S SELF-REGISTERING BAROMETER.

The intention of this contrivance is to register, by means of two barometers, the highest and lowest pressure in the absence of the observer, as some thermometers do. The tubes are to be common ones, but turned up at bottom like inverted syphons, and within the short legs are to be placed silk valves; that in the one to open upwards to shew the lowest, and that in the other to open downwards to shew the highest pressure. I need hardly say that both valves must be opened, and the mercury allowed to settle before the

instruments are left. If it should be thought that silk valves would be too liable to get out of order, I would propose valves formed of glass, as represented in the annexed sketch, in which *A A* represents part of the barometer tube, having two pieces of smaller tube *b b* cemented in, with a disc of glass, *c*, loose between them, and ground to fit air tight on their ends; these must be always below the surface of the mercury: the disc in one of the barometers must be loaded so as to make it sink or rest on the lower interior tube, by which the mercury will be permitted to rise above the valve, but prevented from returning, and thus the least degree of pressure will be indicated: and for indicating the greatest degree, the disc must be made somewhat lighter than mercury, that it may press slightly against the upper interior glass tube, so as to permit the mercury to descend below it, but not to return. *d* is a small platinum or iron wire to open the valve for adjusting the mercury. The same principle may be applied to the barometer described in Number 64 of the *Register of Arts*, which sets its own vernier.



ON A NEW METALLIC PISTON.

BY THE EDITOR.

It has been stated by the late Mr. Tredgold, in his excellent "Treatise on the Steam Engine," that it would be an improvement to admit the steam into the interior of the piston, in order that the elastic force of the vapour might be made to keep the packing closely pressed against the sides of the cylinder. While it is with considerable diffidence that we differ from so great an authority, we are disposed to think that some advantage might be taken of the hint thus given to improve the piston. If the steam were itself to enter between the segments, or other pieces of metal of which the piston is constructed, small particles of sand would insinuate themselves by degrees between the sliding joints, which would before long destroy their proper action, and open fissures for the free passage of the steam through them. Mr. Tredgold seemed to consider that the force of the metallic springs, which are employed in Cartwright's and Barton's pistons, were liable to counteraction by the steam getting between the piston and cylinder. Now the springs cannot be pressed back but through the medium of the segments, and the segments cannot be operated upon if the steam be allowed to press upon their upper and under surfaces, which being of greater area than the sides receive more pressure, and consequently resist the effect of a

lesser force. But admitting, for argument sake, that such an effect can and does take place, the remedy proposed by Mr. Tredgold is worse than the disease; for, if the steam be allowed to operate with its full force laterally, the friction of the piston against the cylinder will be so great as to neutralize entirely the power of the engine estimated from the ordinary data.

From the little reflection that we have been enabled to bestow upon the subject, it appears clear to us that a metallic piston should have no more friction against the cylinder than arises from its barely touching the sides of the cylinder. To produce this contact without the employment of metallic springs, but by the elasticity of the steam only, we have to submit the following arrangement of parts.

Fig. 6, Plate I., exhibits a plan of the piston, and Fig. 7 a vertical section, the letters of reference in each indicating similar parts; *a b c d* are four segments forming the circular area of the upper side of the piston, as shown at *a b* in the section. Underneath these segments are four other segments (two of which are shown at *o o* in the section), arranged so as to break joint in the manner of the Cartwright piston. *e e* are two circular metallic plates, which may cover the *whole* area of the piston; these are ground conical on one side to fit accurately into a conical cavity ground out of the segments: *g* is the piston rod which slides through the plates *e e*, the latter being confined from moving up or down upon the rod by the nut *f*, yet allowing sufficient freedom for the conical surfaces of the segments sliding against the conical surfaces of the plates *e e*.

Now, supposing this piston to be put into a cylinder when it begins to wear, the pressure of the steam upon the plates will cause the piston to expand, and keep it always in contact with the cylinder. There can be no fear of a re-action by the steam getting between the cylinder and the piston on account of the superior pressure upon the plates. To keep the piston expanded but very little pressure will be found necessary, consequently, the conical surface of the plates may form a very acute angle with the flat sides;—a few experiments will determine the degree of obliquity required.

It should be observed, that these conical plates (which are proposed solely with the view of employing the elastic force of steam instead of metallic springs), are equally applicable to Barton's Patent Piston, which we consider to be decidedly superior to those constructed on the Cartwright principle, for reasons which we have before given in our observations upon metallic pistons generally in a former number. We shall not, however, dwell more upon this subject, hoping that some of our ingenious readers will favour us with their opinions on the matter, with suggestions for the further improvement of this important part of the steam engine.

NEW MOTIVE ENGINE,

Patented by RICHARD WILLIAMS, of Tabernacle Walk, London—*Enrolled June*, 1829.

THE use of the elastic force of steam, as a prime mover, has become so extensive, and been found so important, that a very considerable portion of the mechanical genius of this country has long been, and still is, devoted to the construction or improvement of machines to economise the fuel used in producing power through the medium of steam, or rendering its application safe and convenient; and hence have proceeded the almost infinite variety of steam-engines, which have at different times been patented and described in the pages of the *Register of Arts and Journal of Patent Inventions.*

We have on the present occasion the pleasure of adding to the number, one which displays much mechanical ingenuity in the arrangement and adaptation of the several parts of which it is composed. By this remark, we must not, however, be understood to insinuate, that Mr. Williams, by his patent "for certain improvements in the application of elastic and dense fluids to the propelling of machinery of various descriptions," has invented an engine, which will supersede the steam-engine, as it is usually constructed. His object is to avoid the expensive wear and attendant friction of metallic or packed pistons moving in cylinders; and this he effects by having his steam cylinders open at one end, and inverted in a vessel of dense fluid, which will require a much greater heat to convert it into vapour than water; so that steam being admitted successively into the cylinders, three in number, which are attached by rods to a three-throw crank: they are forced up in succession and give motion to a shaft, which may be attached in the usual way to any machinery requiring to be put in motion.

The action of this engine will be readily understood on reference to the drawing, fig. 1, where

a represents the furnace.

b the boiler, partly filled with water, and partly with steam.

c c the dense fluid vessel, which may be considered as partly filled with oil.

d d d three cylinders, closed at their upper ends with a spherical top, and open at their lower ends.

e e e steam reservoirs attached to the bottom of the dense fluid vessel.

f f f rod connecting the cylinders with the cranks.

g g g the cranks and shaft for communicating the motion.

h h h sliding valves for admitting steam from the boiler into the reservoirs, when the cylinders reach the bottom.

i i i conical valves for admitting the steam into the cylinders from the reservoirs, and preventing its escape, when the cylinders begin to ascend.

k k k piston valves for permitting the steam to escape into the dense fluid vessel, when the stems of the valves touch the tops of the vessel, from whence it is drawn off by a pipe communicating with a condenser. These valves are shut again when their stems come in contact with

l l l levers, by which the various valves are opened and closed.

o o o projecting springs attached to the interior of the cylinders, and which act upon the valve levers *l l l*, as the cylinders ascend and descend.

This description of the construction of Mr. Williams's engine will render sufficiently apparent its operation. One of the cylinders, when full of steam, will rise with a force equal to the difference between the specific gravity of the cylinder full of steam, and the dense fluid in which it is emersed; and through the instrumentality of the three-throw crank, the cylinders will be successively brought into operation. We fear the patentee has overrated the imperfections of steam-engines of the usual construction, as well as the power to be derived from his own, which, to produce an effect equal to an engine of the common construction of forty or fifty horse-power, would require to be made of a very inconvenient magnitude.

TO THE EDITOR.

London, Nov. 29, 1828.

SIR,—I beg leave, through your useful publication, to call the attention of miners and the proprietors of coal mines to (what I consider) an improvement upon Sir Humphrey Davy's Safety Lamp, as I feel assured, from some simple experiments, that the wire gauze prevents the flame from passing through it, in consequence of the caloric in its meshes excluding the oxygen of the atmosphere from its support, and not upon Sir Humphrey Davy's theory that the wire gauze cools the flame, or, as he has expressed it, "the cooling powers of solid tissues."

In support of my opinion, I beg to state, that in some of my experiments I found, that when the lamp was cold and newly lighted, and immersed in mixture, that the explosion extended on the outside of the lamp, and that when the lamp was allowed to burn for a few minutes, and immersed in a similar mixture, no explosion took place. I likewise found on throwing a current of hydrogen, or carburetted hydrogen gas, from a bladder and stopcock on the flame of the lamp, that the flame was brought outside of the gauze to the

mouth of the stopcock. In this experiment the mouth of the stopcock must be within half an inch of the wire gauze, and a steady blast continued on the flame so as to cool the intervening wire gauze. When the gauze is as cool as the gas, the flame follows the blast to the mouth of the stopcock. This experiment *is supported by one of Sir Humphrey Davy's.* See his book on the Safety Lamp, p. 97, where he says, "A small aperture was drilled at the bottom of a wire-gauze lamp in the cylindrical ring which confines the wire gauze—this, though more than one-eighteenth of an inch in diameter, passed the flame, and fired the external atmosphere." AND WHY DID IT DO SO? *but in consequence of the drilled aperture in the solid brass being colder than the apertures in the wire gauze.* My opinion is also supported by what some time since took place at MR. PERKINS's Steam engine Manufactory. *One of the tubular boilers partially burst when at a red heat, and the caloric in the rent prevented the water and steam from issuing out until the fire was withdrawn, and the temperature in the rent reduced to the temperature of the water and steam in the boiler.*

Paper carbonises on wire gauze over the flame of a candle, but does not inflame. A red-hot coal does not burn or injure a silk handkerchief when the latter is stretched on the back of a watch-case (this experiment is well known), the first cannot inflame from want of oxygen on the under surface, and the other remains uninjured, in consequence of the caloric proceeding from the burning coal producing rarefaction between the coal and the watch-case, and a want of the necessary quantity of oxygen to excite combustion.

It must also be obvious, on a moment's reflection from Sir Humphrey Davy's experiments, that the reason why "inflammation cannot be communicated to explosive mixtures in long narrow canals of metal, or in short canals of smaller diameter," *is rarefaction produced by the approaching caloric,* together with the resistance I shall presently mention, or when confined, and the electric spark applied, that, like gunpowder under pressure, it will be gradually decomposed without explosion. *The communication of heat through tubes must depend upon a discovery I recently made in pneumatics,* that air is inflicted by the sides of tubes producing resistance inversely as the squares of their diameter, or, in other words, in proportion to the smallness of their diameters,† and it is this resistance which contributes along with caloric to the safety of the wire-gauze lamp.*

I may also observe, that the experiments of LIBRI, showing that flame is inflicted by metallic rods, and that "when two flames are

* "At Cowglen, on the morning of Monday the 10th instant, as George Anderson, Oversman, Gabriel Wingate, Sen., Andrew Bennie, Sen., and James Ross, miners, *were proceeding* to a distant part of the mine to repair a road, *their lamps ignited the gas* which had collected at the roof, and an explosion took place, by which they were scorched, the three men slightly, but Mr. Anderson severely. His whole body was one entire blister of a blackish colour. He died on Thursday morning, leaving a wife and nine children to mourn over him."—*Greenock Advertiser: copied into the Globe, November 21, 1828.*

† See the Examiner, No. 1076, and Globe, 8072.

made to approach each other there is a mutual repulsion, although their proximity increases the temperature of each instead of diminishing it." Support the principle I advocate, *the infliction being occasioned by the rarefaction of the air between the rod and the flame, the latter seeking for oxygen to support it in a denser medium, the two flames repelling each other for the same reason, and not through any mysterious or "repulsive effect of the wires of the gauze tissue."**

I have remarked, that whilst the corruscations appear on iron at a white heat (from the decomposition of the air and formation of an oxide on its surface), that it ignites carburetted hydrogen gas, and appears occasionally to attract it, which must arise from the currents and motion produced in the atmosphere by the combustion; whilst, on the contrary, at a red heat it only rarefies the gas, and operates upon it like heat on a fire-balloon making it ascend. These facts prove (which is perfectly reasonable) *that the heat which cannot combine with oxygen gas to produce combustion, cannot combine with carburetted hydrogen gas to produce ignition and explosion*, and that the wire-gauze lamp requires *a shield, that cannot be injured by heat*, to make it in reality a safety lamp. *The shield prevents a strong current of gas from cooling the wire gauze, and producing explosion, or a weak current from raising the temperature of the wire gauze to a white heat pressing upon it, and producing the same effect*; and it is lamentable to reflect on the number of human beings who have perished, and are almost monthly perishing from not using it, and being aware of the causes which contribute to produce perfect safety in explosive atmospheres.

"It being necessary to know the nature of a disease before an effectual remedy can be applied," I have in my improved safety lamp increased the heat to increase the rarefaction, and placed on it a shield of talc *to protect the meshes of the wire gauze from being cooled by a current, or exploding at a white heat, an explosive atmosphere pressing upon it*. A semicircular shield is sufficient in common circumstances, and to prevent the pressure of air on the gauze consequent on the motion of the miner through the mine; but a circular shield is necessary where much danger is apprehended.

Should the proprietors of coal-mines object to the additional expense in oil and a shield, *coal gas may be used with perfect safety, and add to the comforts of the miner by giving him increased light, and* (by the arrangement of the lamps in the SHAFT to produce *ventilation*), *an improved atmosphere*. The gas-light may be conveyed into the most remote workings, *and ascending and descending currents produced in the shaft. The lamp can be lighted without taking off the shield, or gauze covering; by having a close and folding hinge in a segment of the bottom of the lamp, allowing it to open and shut. A little turpentine placed in the cavity of the immoveable part of the bottom, at the mouth of the gas-pipe, and a mixture of nitre and sulphuric acids in an inclined cavity in the moveable part—on the latter being raised up to the ledge to which it is fastened by a spring latch, the mixed acid runs in a groove into the cavity containing the*

* See Mechanics' Magazine, Nos. 218 and 259.

turpentine, and an instantaneous light is produced and communicated to the gas on turning the gas-cock, which is on the outside of the lamp.

The person who cleans the lamps should supply the cavities with turpentine (a few drops are sufficient), and the person who has charge of the lighting should supply the acid to prevent the possibility of accident.

The lamps (after being prepared) could also be lighted or extinguished simultaneously by means of small chains leading to the mouth of the mine attached to a spring lever and index; but this would be more ingenious than useful, and I mention it only to show that I had thought of it, and in connexion with lighting and extinguishing by means of opening and shutting a valve in a box in the bottom of the lamp containing inflammable matter under confinement.

Although there is much difference of opinion among philosophers upon safety lamps, some denying their utility in toto, and others admitting they are useful, while they differ in opinion upon theories, I hope I have said sufficient to convince the most ignorant miner that a shield is necessary, and to induce the proprietors of coal-mines to give the subject their further consideration.

I am, Sir,

Your obedient servant,

RICHARD DILLON.

PLAN AND DESCRIPTION OF A STATIONARY FIRE-ENGINE,

That may be enclosed in an ornamental pillar, and erected at the extremities of the pavements, in front of houses and large establishments.

FIGURE 1 (Plate), is an elevation, and figure 2 a plan of the engine. The letters, in both figures, refer to the same parts. *a a,* a hollow pillar, enclosing the engine; *b,* pump cylinder and piston; *c,* spout; *d, circular* mouth-piece, to which the hose may be screwed on *when wanted; e,* a metal plate to separate the spout from the air-chambers; *f f,* pavement; *g g,* valve box under the pavement; *h h,* water pipe; *i,* suction pipe, communicating with water pipe; *k,* suction valve; *l,* spout valve; *m,* pump handle; *n,* an iron fulcrum, resting on the pillar, and may be removed when done with; and, *o o,* air-chambers, the tops of which, of course, are covered over *air-tight.*

If the area of the pump cylinder in this engine should be equal to the areas of *both* the pump cylinders in the ordinary *double* acting fire-engines, and the areas of the spout and air-chambers the same dimensions, the effect would be nearly equal to what is produced by the double acting engines; because there would be as much water forced through the spout valve, by a single stroke of this engine, as there is by a double stroke of one of the others. It may, perhaps,

be worth while to remark here, as I believe it is not generally so understood, that the area of the *spout* valve "*I*" ought to be, *at least*, as large as the area of the piston; because, in the same proportion that it is less, there will be an expenditure of power to no purpose: suppose, for instance, the area of the piston to contain four inches, and, in that case, it would require as much force—as many hands to lift a certain portion of water through a valve of one inch area, as it would to lift four times as much water through a four inch valve.

When the engine is done with, the fulcrum, pump handle, and hose, may be removed to any appointed place that is near at hand; and the head or cover of the pillar is to be placed upon the top of it; and if the force of the water should be sufficient to raise itself above the head of the pillar, the mouth piece may be closed by a stop cock or valve.

As the suction pipes of these engines communicate immediately either with the main water pipe, or a well, or reservoir, appointed for the purpose, there never can be a deficiency, or a *waste*, of water, where they are used, as is frequently the case with the other engines, that are obliged to obtain their supplies from water *running loose about the streets*. Two, four, or half a dozen of these engines in the front of a large house, without being at all in the way, would be an ornament rather than otherwise: and would be attended with this advantage, that there would be so many *additional* engines in full play, at least ten or fifteen minutes before the others could be brought to the spot; and a single engine, at the first breaking out of the fire, might be of more service than a dozen engines some time afterwards. These engines might also be erected in back yards, where the wheel engines could not obtain admission; and if one of them should be erected in the front of every house in a street, there would be at least three *additional* engines, ready, at a moment's notice, for the protection of each house.

TO THE EDITOR.

Sir,—It very frequently happens, on the breaking out of a destructive fire, that there is a complaint of either a deficiency of water, or a delay in bringing up the fire-engines; and it has occurred to me, that both these inconveniences might be in great measure prevented, by the erection of stationary engines, in the form of handsome pillars, in front of houses and large establishments, with suction pipes communicating *directly* with the main pipes, or reservoirs prepared for that purpose. If you should agree with me, and think that the adoption of the annexed plan might be attended with utility, I shall feel obliged if you will give it a place in your Miscellany, together with any observations of your own that may help to improve it.

I am, Sir, &c. &c.

July 15. WALTER FORMAN.

P.S. You were so good as to notice a pamphlet of mine, in which I recommended the *trial* of an instrument for increasing the relative powers of the sun's and moon's attractions; and as I am now convinced that what I proposed is physically impossible, I shall be equally obliged if you will make this known to the public.

NEW MODE OF HEATING APARTMENTS.

Sir,—Two well known qualities of air, are those of compression under mechanical powers, and expansion when exposed to the influence of heat; by this latter process its specific gravity becomes affected, that is, in equal bulks of hot air; and air at the common atmospherical temperature, the former was found to be the lightest. It is upon a knowledge of this property in air, to be affected by heat, that the warming of rooms is conducted, and it is only in those cases where this principle is not properly attended to, that apartments remain in a manner unbenefitted by the fires they possess? thus, it may happen that the setting of a grate too far back in the fire-place, proves detrimental to the warmth of the room, by carrying the greatest portion of heated air up the chimney flue. Under all circumstances however, the fire in the common grates, gives out a very partial heat to the room, and a very unnecessary quantity of warm air escapes along with the smoke.

The common fire-grate being in numerous instances preferable to stoves, it has been my study to render it still more serviceable in the heating of rooms, upon a plan cheaper than any before employed, and at the same time simple and not in the least interfering with the "setting up" of the grate, which alone, easy as it may appear, is yet matter of sufficient difficulty with many workmen. I have not only aimed at economy, but portability also, and I flatter myself, this warming apparatus, will be found in practice to be a useful and convenient addition to household furniture, from its being applicable to the grate of any fire-place, and possessing equal effect in all situations. In families this cheap and simple apparatus will be found peculiarly beneficial in the airing of chambers, damp rooms, cellars, &c., where, as ornament is not a matter of much consideration, those intended for such purposes only, may be made of the cheapest materials; but for the parlour or drawing-room, as a matter of course, a little more expense must be incurred to produce it in an elegant form.

When in use, it will be observed that this air heater, though comparatively small (for two might be hung on a bar eighteen inches long) has the power of distributing very hot air, which is attributable to the following cause; air, like all other imperfect conductors of caloric, only receives an impression of heat at the point of contact, that is, the heat does not spread itself rapidly through the whole body of air, but only by slow degrees, therefore I have divided the body of air, presented by this machine to the action of heat, into

strata, (if I may so express myself), of these there are three, (*see the engraving*) and the hottest alone is allowed to pass off into the apartment. The division from which this escapement takes place, is supplied with air from the remaining two, prepared with a degree of heat, derived from the waste heat of the metal, so that the whole apparatus has been contrived on true philosophical principles.

Having said thus much in its favour, it may be deemed superfluous to launch out into further details of its merits; under this impression I shall proceed to give some account of its construction.

H. D.

London, June 18, 1829.

Reference to the Engraving.

Fig. 1. A perspective view of the apparatus, the references to which apply also to the other figures. *a*, is one of the hooks for attaching it to the upper bar of a grate; *b*, a projection or hood, to convey the hot air into the apartment; *c*, an aperture for the admission of cool air; *d, d*, a curved slip of sheet iron, to prevent the smoke from being drawn into the room by the hood *b*, which it completely effects, even in a fire-place otherwise liable to smoke; *e*, a metal strap to receive the tongue *g*, Fig. 4. of the plate *f f*, for lengthening the hood *b*, and carrying the hot air further into the room.

Fig. 2. A section of the apparatus, showing the serpentine passage of the air in the divisions *h h h*; *f*, the situation for the plate Fig. 4, marked by dotted lines.

Fig. 3. A back view of the air-heater, *a a a*, three hooks, behind which is inserted the curved plate *d*. The middle hook should project about one inch, and the outside ones, about two inches, to suit a circular or a straight barred grate, as, for the former all the hooks will be engaged, but for the latter, only that in the middle will be serviceable.

Fig. 4. A plate, to be used when the draught of the fire-place affects the course of the current of hot air. It has merely its two outer edges turned square.

Fig. 5. The heater dissected; the dotted squares show where the trays *i i*, are to be hard soldered or rivetted, *c c c c c*, three oblong openings for the admisssion of air, through which it takes the winding passage shown by the small darts.

The whole apparatus (except the curved plate *d d*) is best made of sheet copper or brass, and all the seams may be rivetted, provided they be afterwards luted with a little thick white or red lead paints. It may be also proper to notice here, that though the projection or hood is supposed to extend only one foot or one foot and a half from the fire-grate, it may with ease, be contrived of greater length to bring the hot air still further into a room.

H. D.

INSTANTANEOUS LIGHT APPARATUS.

TO THE EDITOR.

Guernsey, July 22, 1829.

Sir,—Although I am aware that it is a common chemical experiment to effect combustion, by the sudden compression of atmospheric air, I do not remember to have seen or heard of tinder-boxes in England constructed on this principle, notwithstanding they have now become common in this island, and in many parts of the continent. I have one of this kind in my own use, of French manufacture, which I find to be so very convenient, and so much superior to other instruments made for the purpose, that I am desirous to see a description of it in your Journal, in order that my friends in England may avail themselves of its utility. Annexed is a sketch of this little apparatus (see Fig. 14, Plate II), which requires no explanation to the scientific, but to those who are otherwise, I would state, that *a* represents a neatly-turned brass cylinder about 3¼ inches long accurately bored throughout; the upper part of this tube is of a bulbous form as at *b*, and at the bottom is a leather washer, which is pressed air-tight against it by means of a screw turned in the head of the tinder-box *c*; *d* is a plunger which fits the tube air-tight, and having a cavity at its lowest extremity, in which is placed a small piece of the amadou, or German tinder, (taken out of the magazine *c*.) Thus cleared the plunger is placed into the tube, then thrust down smartly, and immediately withdrawn, by which process the tinder is ignited.

I remain, your constant reader,

An Old Fisherman.

The apparatus described by our correspondent is by no means rare in this country, but, as it is deserving of being better known, we give it insertion.—Ed.

NEW CARRIAGE FOR PALMER'S RAILWAY.

By Mr. T. Chapman, Royal Row, Lambeth.

Mr. Palmer's railway is a single rail, elevated sufficiently above the ground to allow of two boxes being suspended, one on each side of the rail and near to it, from two wheels one behind the other on the rail, and, when making a turn, a portion of the rail turns with the carriage on it.*

Mr. Chapman's contrivance is to make the carriage move from one angle on to another, or along a curved rail as well as a straight one.

Fig. 1 is an end view; fig. 2 a side view, partly in section. *a a*, the rail; *b b*, two wheels on the rail; these carry the turning-plates

* This Patent Railway is fully described, with Engravings, in the first volume of this work, first series. No. 7.

Fig. 1.

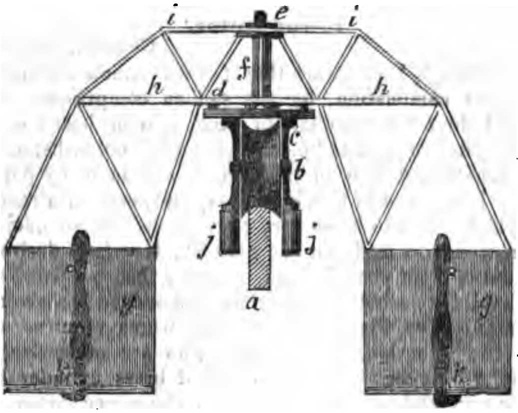
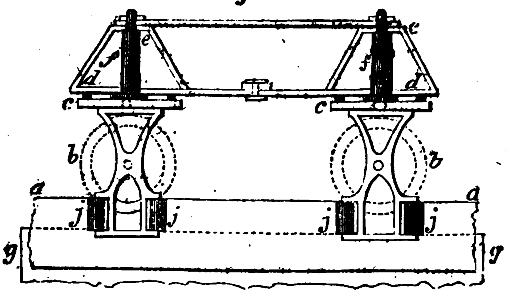


Fig. 2.



c c, each having four friction-rollers; *d d*, the carriage plates lying on the friction-rollers; *e e*, upper plates; *f f*, the vertical axis of the wheel frames or turn-plates *c c;* they pass through the plates *d* and *e*, from which the boxes *g g* are suspended by the lateral arms *h h* and *i i*. Now, as the wheels and frames *b c* can turn freely on their axis *f f*, they each require four guiding rollers *j j j j*, to keep them in a right line with the rail, and to cause them to turn as the rail turns. These carriages should not be farther asunder than is absolutely necessary for the required curve of the rail, it being a great advantage in Mr. Palmer's carriage that the boxes are so close to the rail, and so little top-heavy, that a considerable inequality of weight produces very little disturbance of the equilibrium. The bottom of the carriage has a joint at one-third of its length, and is held up at this by the hooks *k k*; by removing these, the contents may be let out: the fixed portion of bottom is made sloping, so that it may be readily emptied.

IMPROVED LITHOTOMY FORCEPS.

Communicated by MR. CLULEY, of Sheffield.

AMONG the diseases incidental to mankind, none are more distressing in their nature than the stone in the bladder; the extraction of which, under the most favourable circumstances, is attended with considerable risk, and much bodily suffering: the latter is frequently increased, by circumstances which can only be discovered during the operation. Such, for instance, as the size, shape, or number of the stones, as well as their consistency in texture; therefore the result of the operation depends on contingencies, and on the facility with which the stone can be extracted.

As a manufacturer of surgeons' instruments I have had many opportunities of witnessing the operation of lithotomy, and am convinced that the forceps in common use are not calculated to extract the stone with ease or expedition, the blades of which being only slightly concave within, and furnished with teeth, render them extremely objectionable; for the thickness of the blades, added to the diameter of the stone, especially a large one, causes such an extension of the forceps, that much laceration takes place, and often compels the operator to again apply the knife to enlarge the orifice, the stone often eludes the grasp of the forceps, in consequence of which, when the operator considers he has the stone fairly within the blades, he too frequently applies additional pressure, in order to keep hold during the extraction; in this the operator is frequently defeated by the stone breaking in pieces under the severe pressure, or small portions breaking off by the action of the teeth of the forceps, which may form a nucleus of a second formation of stone.

The improved instrument has three blades (as shewn by figure 5), and is well adapted to extract large and irregular formed stones, also such as may be in a decomposed state; for, when the stone is within the improved forceps, no extra pressure is needful to retain it there, and the blades being hollow and of a bulbous form they receive the stone within their cavity without any extra extension, or probability of breaking the stone, or any part thereof during the extraction.

PURIFICATION OF LINSEED OIL.

MR. Cugan's process, though resembling M. Thénard's in the first part of it, is completed by the judicious introduction of steam; by means of which the oil appears to be almost entirely freed from acid, and the black feculent dregs subside in the course of twelve hours, leeaving the upper portion of the oil quite clear, and greatly improved in colour, and in those qualities for which it is valued by the painter,

The quantity of oil that he operates upon at once is about 100 gallons. For this, three quarts, that is about ten pounds, of sulphu-

ric acid, oil of vitriol, is required. The acid is to be diluted with an equal bulk of water. The oil being put into a copper pan, of the shape of a boiler, two quarts of the dilute acid are to be added; the whole is then stirred up very carefully for an hour or more with a wooden scoop, till the acid is become completely incorporated with the oil, and the colour of this last has become much deeper than at first. A second similar quantity of acid is then to be added and mixed with the oil in the same way as the first was; and after this, the remaining third part of acid it to be added. The stirring of the oil is to continue incessantly about six hours in the whole, at the end of which time the colour of the mixture will be almost that of tar. It is then to be allowed to stand quiet for a night, and in the morning is to be transferred to the boiler;—this is of copper, and has a steam pipe entering it at the bottom, and then dividing into three or four branches, each of which terminates in a perforated plate. The steam thus thrown in, passes in a very divided state into the oil, penetrates into every part of it, and heats it to the temperature of boiling water. The steaming process is to be continued for about six or seven hours, at the end of which time it is to be transferred to a cooler, of the form of an inverted cone, terminating in a short pipe, commanded by a stopcock, and also having a stopcock inserted in its side, a few inches from the bottom. After remaining a night in the cooler, the oil is fit to be withdrawn; for this purpose the cock at bottom is opened, and the black watery acid liquor flows out. As soon as the oil begins to come, the cock is closed, and that in the side of the cooler is opened. From this the oil runs quite clear and limpid; the whole of that which is still turbid remaining below the upper cock. The purified oil being drawn off, that which is turbid is let out into a reservoir, where it either remains to clarify by subsidence, or is mixed with the next portion of raw oil.

SCIENTIFIC & MISCELLANEOUS INTELLIGENCE.

Straw Plait for Hats in Scotland.—The Highland Society offered several premiums in 1825 and 1826, for encouraging the home manufacture of straw plait, in imitation of Leghorn straw; four communications were sent to them on the subject, which they have thought worth publishing, and which are accordingly given in the last number of the Quarterly Journal of Agriculture. The first communication is from Messrs. J. and A. Muir, of Greenock, who, after experiments on various kinds of straw, had confined themselves to the use of rye straw, as plaited in the Orkney Isles. The straw is procured and prepared in the following manner:—Not being able to procure seed in Orkney, rye not attaining maturity there, they send annually from Leith from 40 to 45 bolls, which are sown on about 12 English acres of sandy soil, manured with sea-weed. Several acres of heath for bleaching the straw, and water for steeping it, are required in the neighbourhood of the rye fields. The rye is cut

when the seed is beginning to form, and it is necessary to attend to the precise time; for ten days too early or too late, produce a considerable difference in the look of the straw. When the rye is cut, women are employed to tie it at the lower extremity in handfuls; it is then put into boxes, and covered with boiling water, in which it remains for half an hour. After this, it is spread out upon the heath, in a fan form, and turned twice daily, until the bleaching, which takes about ten days, is completed. If exposed to much rain while bleaching, the straw is injured in colour, and rendered very liable to take mildew. It is of great importance to have the crop well housed. From information obtained by Messrs. Muir, from the London Custom-house, it appears that there are imported to London alone, exclusive of those to Liverpool and Dublin, upwards of 20,000 dozen of hats annually, a quantity which, if made in this country, would give employment to more than 20,000 females, besides those already engaged in making the different kinds of straw hats, A straw plait manufactory, established at Strontion, on the estate, and by the exertions of Sir James Riddell, has been in operation two years. The establishment for instruction was commenced in May 1827, with about twenty girls. The scholars soon became more numerous, and in November 1828, they amounted to sixty, of which fifty were employed in plaiting, and the rest in preparing the straw, in knitting, or making up the plait into bonnets, hat-bodies, &c. The children are admitted when about seven years of age, but they seldom receive payment before ten or twelve months after; the first 10s. they make, going for an apprentice-fee, and the next 10s. for clothing, with which they are furnished by the managers. As they are confined to certain branches, they soon attain to such proficiency in these, that a dexterous plaiter can earn from 5d. to 8d. a-day, and a good knitter from 8d. to 1s. They are also allowed to take to their houses materials for working, which, independent of the zest it must necessarily give to cleanliness at home, holds out a strong incentive to those who have a desire to be industrious. The establishment is represented as having produced a great change in the character and deportment of the natives of the place (the male population of which is chiefly engaged in working of lead mines), exciting a taste for cleanliness and neatness, which has been produced, not only upon those employed, but also upon the general appearance of the neighbourhood. A third communication was, that of the proceedings of a Mrs. Graham, who, about four years ago, procured a book of Cobbett's 'Cottage Economy,' from a farmer in that district; and finding there some instruction about the plaiting of Leghorn bonnets, immediately set about turning it to advantage. By means of Cobbett's figures and descriptions, she succeeded in discovering the proper sorts of grass in the fields, and then in bleaching, cleaning, and plaiting it, as he prescribed. Further trials gave her more insight, and in this branch of the business she was soon perfect. The sewing of the plait together cost her more trouble; but this also she at last accomplished to her satisfaction, The art of pressing, smoothing, and trimming the plait, was

next learned, and, before long, various Leghorns of her manufacture were to be seen in actual wear, in that quarter; indeed, as many as she could make were willingly bought by the shopkeepers of Dumfries. A fourth communication details the process adopted by Mr. David Strange, teacher of the subscription school of the village of Loanhead, who found the winle-straes, the Holcus lanatus of botanists, or soft meadow grass, common in all parts of the country, well adapted for the purpose.

Preservation of Grapes for Winter Consumption.—The vine to be grown in hot-houses, but without fires, except in the autumn, when the damp season begins. At that period the flues should be heated at about nine or ten o'clock in the morning, admitting air at the same time. After twelve o'clock no more fire should be lighted, and the glasses should be closed air-tight. These proceedings should be continued as long as any grapes remain. The simultaneous action, during the day, of the fire and air prevents the entrance of any humidity. Should the flues be heated during the night, when it is required to keep the hot-house closed, the vapour would produce dampness. In this manner grapes have been kept in good preservation until the beginning of February.—*Magas. d'Hort. de Weimer.*

Mode of making the Heads of Artichokes grow large.—An excellent method of increasing the size of artichokes is to split the stalk at the top in four parts, and to introduce through the cuts two small stakes of wood placed across. This operation has been long practised in the south of France; several gardeners in the neighbourhood of Brussels have adopted the same custom for some years past, and have obtained much larger artichokes than formerly. Care should be taken not to perform the operation until after the stalk of the artichoke has required its full height.

Economy in Gas Burners.—Mr. Lowry, of Greenock, in a communication to the Philosophical Magazine, gives the following accounts of his experiments to ascertain the best means of combining economy in the consumption of gas with the obtaining the greatest brilliancy of flame. Burners, whose circle of holes were 5-8ths of an inch in diameter, were tried with from five to fifteen holes in the circle, and the consumption was always the least with the greatest number of holes, though no great difference was observed when the holes were so near each other as to allow the jets to be perfectly united. An enlargement of the holes also produced a saving. When the central air aperture was stopped, or partially so, the flame rose considerably, but was conical and dull; but when the central and outer apertures were proportionally reduced, the flame became bright and cylindrical. On shortening the glass chimney, more light was obtained from a given quantity of gas; and on taking off the glass altogether, less gas was consumed in proportion to the light given out.

A perforated plate was laid on the top of the glass chimney, and the quantity of light was increased; and the same effect took place

by using a glass whose diameter at top was equal to the openings found most advantageous in the perforated plate.

On doubling the height of the glass chimney, the flame fell to about one-half of its former height.

From the trials made by Mr. Lowry, he drew the conclusion that the greatest effect was produced when the holes were numerous, and rather large than small, the central aperture narrow, and the glass near the flame, the outer aperture being in such proportion to the inner as to keep the flame cylindrical. This construction, however, when carried to the extreme, being attended with the practical disadvantages, that burners being often placed in exposed situations, the least motion of air brings the flame in contact with the glass in such a way as to produce smoke, and the glass being intensely heated is more liable to be broken. He found it answered the purpose fully as well to enlarge the air aperture, making the glass chimney rather wider and shorter, reducing in this manner the speed of the air through it.

Experience, concludes Mr. Lowry, has shown that burners made on the plan last above described, answer the purpose of requiring less gas than other burners, and giving at the same time as brilliant, and perhaps a more beautiful flame.

Russian Bears.—The Russiah Bears, it appears, never lie down before the first snow has fallen. They then prepare a soft bed for themselves of moss, straw, and brushwood, generally under a large tree, on which they repose, and never move again until the spring. They eat nothing during the whole of that time, which they spend in a quiescent and almost dormant state: they have however been observed to lick the upper part of their paws, which is always found destitute of hair, if they are shot or taken immediately after the winter. These animals are no little annoyance in many parts of Russia during their active state of existence, and have from time to time infested the neighbourhood of large towns. Even the vicinity of St. Petersburgh is not always free from them; which circumstance has made bear-hunting a fashionable diversion among the higher classes during the early part of the winter. A party consisting of several gentlemen agree to go bear-shooting, and find a man who can give them the necessary information respecting the track of one of these animals, which is generally perceived on the first fallen snow. The whole ground on which such a track appears is surrounded, so that the bear may not escape when roused and wounded. The party start from St. Petersburgh at about eight or nine o'clock in the evening, the thermometer being, probably, at the time as low as five or six, and perhaps more, degrees below the freezing point, and travel about fifteen, twenty, or thirty versts, so as to arrive early on the field on the following morning. The track guides them to the spot, and the animal is generally found lying quiet and passive. Both men and dogs are then employed to rouse it: the hunters at the same time watching its motions. The bear at last starts up at this intrusive and irritating treatment, and looking round with eyes of fire, selects

one from among his enemies, and darts toward him as fast as its ponderous body will permit, At this juncture the intrepid sportsman waiting for its near approach, fires at it, and quickly reloads his gun. If it still advances, or the gun has either missed fire, or done but little execution, a second and a third sportsman are ready with their weapons to protect their friend, and with a surer aim bring the animal to the ground. It is seldom indeed that the bear breaks away altogether from the hunters, on the contrary, it will advance boldly towards them, and receive the fire with a deep groan. It is then sent as a present, for the sake of the skin and the paws, the latter having the reputation of being delicious morsels for the table, equal, as I heard a noble epicurean observe, to the best *palais de boeuf*. The sportsmen are dressed for the occasion in a hunting jacket, lined with fur, and wear water-proof boots, with another inside pair of flannel boots, which, while they allow of a full free motion of the feet, also keep them dry and warm.

LIST OF NEW PATENTS SEALED.

STEAM ENGINE.—To Elijah Galloway, of King Street, in the Borough of Southwark, for improvements in steam engines, and in machinery for propelling vessels, which improvements are applicable to other purposes. 2nd. July. Six months.

PROPELLING.—To Jacob Perkins, of Fleet Street, in the city of London, for improvements in machinery for propelling steam vessels. 2nd. July. Six months.

GAS LAMP.—To Thomas Kilby, of Wakefield, and Hugh Ford Bacon, of Leeds, for a new or improved gas lamp or burner. 2nd. July. Six months

PROPELLING.—To Robert Crabtree, of Halesworth, for a machine or apparatus for propelling carriages, vessels, and locomotive bodies. 4th July. Six months.

BUILDING.—To William North, of Guilford Place, Kennington, for an improved method of constructing and forming ceilings and partitions for dwelling houses, warehouses, workshops, or other buildlings, in order to render the same more secure against fire. 4th July. Two months.

AXLETREES.—To Margaret Knowles, of Lavender Hill, Battersea, for an improvement in axletrees for, and mode of applying the same to carriages. 4th July. Six months.

AXLETREES.—To George King Sculthorpe, of Robert Street, Chelsea, for improvements on axles or axletrees, and coach and other springs. 4th July. Six months.

CLOTH.—To Joseph Clisild Daniell, of Limpley Stoke, Wilts. for improvements in machinery applicable to dressing woollen cloth. 8th July. Six months.

HARNESS.—To William Leeson, of Birmingham, for improvements or additions to harness and saddlery, part or parts of which improvements or additions, are applicable to other purposes. 8th July. Six months.

MALT KILN.—To Thomas Salmon, of Stokeferry, Norfolk, for an improved malt kiln. 8th July. Six months.

POWER LOOM.—To William Ramsbottom, of Manchester, for improvements in power looms for weaving cloth. 8th July. Six months.

STEAM.—To Moses Poole, ot Lincoln's Inn, Middlesex, for improvements in the apparatus for raising or generating steam and currents of air, and for the application thereof to locomotive engines, and other purposes. 8th July. Six months.

SURVEYING.—To James Chesterman, of Sheffield, for improvements on machines or apparatus for measuring land, and other purposes. 14th July. Six months.

TO OUR CORRESPONDENTS.

We have to apologize to H. D. for omitting to give copies of the excellent drawings which accompanied his valuable Communication; these drawings were unfortunately lost by our engraver, soon after they were received.—Under these circumstances we made out the sketches herein given as well as we could from the text, and from recollection, which we trust will sufficiently explain the arrangements without the fifth figure, which is altogether omitted.

The favours of R. C. and An Engineer, are intended for our next.

DESCRIPTIVE ACCOUNTS OF ALL THE

PATENTS ENROLLED BETWEEN 20TH JULY AND 20TH AUGUST,

Particularizing the Offices in which they may be inspected, with the Dates of Inrolment.

IRON MANUFACTURE.—To Josias Lambert (of Liverpool Street, London,) a Patent "for an improvement in the process of making iron, applicable to the smelting of ore, and in various subsequent stages of the process up to the completion of the rods or bars, and also for the improvement of the quality of inferior iron," was granted March 30, and the specification was enrolled in the Inrolment Office on the 30th of July, 1829.

Mr. Lambert's improvement in the process consists in the introduction of salt and potash, in the proportion of two of the former to one of the latter into the furnaces during the process of smelting, puddling, and refining the iron.

The quantity of the mixture which he proposes to introduce during the process of smelting is about fifteen pounds to the ton of ore, and, during the process of refining, twelve and a half pounds to the ton, and, in puddling, about eleven pounds to the ton; but these quantities may be varied according to the quality of the crude materials, as well as the quality of the iron intended to be manufactured. The mixture of salt and potash is to be incorporated with the iron while in the furnace, by stirring during the different processes of smelting, puddling, and refining.

GENERATING STEAM.—To John Braithwaite and John Ericesson, of the New Road, engineers, a patent "for a mode or method of converting liquids into vapour or steam" was granted on the 31st of January, and his specification was inrolled in the above office on the 30th of July, 1829.

The intention of this patent is, to cause an increase of the draught, and consequently in the quantity of hot air which passes through the flue, applicable to those cases where a sufficient draught cannot be obtained, because of the limited altitude of the flues. This object the patentees propose to effect, either by exhausting the air at the top of the flue, or by condensing in a quantity of air at its bottom, by the application of a double-acting air-pump with a single cylinder, situate either at the top or bottom, according as it is employed as an exhausting or a condensing apparatus. When applied at the bottom of the flue, and used as a condenser, it has in connection with it an air reservoir, in the form of a pair of bellows, loaded with a weight, to equalize the supply of air to the fire, and

in this case it does not differ materially from blowing machines, very frequently used to supply air to furnaces on a large scale. In both cases the air-pump is to be worked by the engine for which it assists in raising a supply of steam.

The patentees employ a cylindrical steam-boiler, placed horizontally, with the furnace underneath one end, and the flue proceeding along within it, near the upper part, and returning in the middle, and then proceeding along near the lower part again to the end furthest from the fire where it is connected with the exhausting cylinder, if exhaustion be employed; but if the condensing or blowing apparatus be employed, the flue communicates with the open air at the end farthest from the fire.

The flue is made conical, diminishing in size as it recedes from the furnace by which its capacity in various parts will correspond with the space required for the air to pass through; for, as the air parts with its caloric to the water, it becomes condensed, and requires less space to pass through.

Manufacture of Hats and Bonnets.—To Alexander Daninos, of No. 21, Leman Street, Goodman's Fields, London, a patent "for a certain invention for the manufacture of improved hats and bonnets, in imitation of Leghorn straw hats and bonnets, which invention was communicated to him by a foreigner, residing abroad," was granted on the 5th of February, and the specification was inrolled in the above-named office on the 4th of August.

The materials employed by Mr. Daninos are cotton, silk, or other fibrous substances, which he manufactures into hats and bonnets, to resemble those plaited bonnets, known by the name of Leghorn. The fibrous substance is first to be dyed of the required colour, and then immersed for a short time in a bath composed of one ounce of curd soap, dissolved in a pint of hot water, and, when the temperature of the mixture is reduced to 70° Reaumur, one pint of alcohol at the temperature of 36°, of the same scale, is to be added. After the substance has been thoroughly impregnated with this mixture, it is to be dried in the open air, and then immersed in a second bath, composed of five pennyweight of muriate of lime, one pint of rain-water, and one pint of alcohol, and to be again dried in the open air. The next process is, to give to the substance thus prepared an appearance resembling the Leghorn plait, which, for the crown and body of the bonnet, is effected by stamping it on one side with a metallic die, on which the form of the plait is engraved, being placed upon pasteboard, or other yielding material, when the die is applied. But for the rim, which, being usually worn without lining, required

the impression to be on both sides two dies, with precisely similar engravings, are employed, between which the substance is pressed, which gives both sides the appearance of plaited straw.

If the fabric employed be considered too thin, two or more webs may be glued together by a composition made of isinglass, starch, and gum arabic, dissolved in water, and mixed with spirits of wine. The same cement is to be employed in joining together the several parts of which the bonnet is composed, and the joinings are secured by a piece of the cloth of which the bonnet is made being applied on the inside.

The patentee states that he will be able to manufacture bonnets in this manner, which, being impervious to rain, will last longer and look better than the Leghorn bonnets, though at less cost.

Dressing Flour.—To John Smith, of Bradford, Yorkshire, Miller, a patent "for certain improvements in machinery for dressing flour," was granted on the 4th of June, and the specification deposited in the Inrolment Office on the 4th of August.

To clean flour from the pieces of husk which remain mixed with it after grinding, a cylindrical revolving sieve, made of iron wire, with brushes revolving in the interior, to clear the flour from between the wires, is usually employed: and the present patent has for its object in the first place, to improve the manufacture of this revolving sieve; and in the second, to make it more efficacious in its application. Mr. Smith's improvement in the manufacture of the sieve, consists in securing the wires of which it is composed into a groove between two flanches, which are screwed together when the wires are inserted: and the introduction of several circular partitions extending a few inches from the interior of the wire cylinder. And his improvement in the application, which seems by far the most important, consists in the application of a brush to the exterior of the revolving sieve, for the purpose of assisting in clearing away the particles of flour and husk which stick between the wires of the sieve. Now as it is the coarse flour, or small pieces of husk, &c. which stick between the wires, the advantages of applying an exterior brush to remove them again into the interior of the sieve, becomes very apparent, as the flour will be, by this means, much more effectually cleansed.

Artificial Illumination.—To Edward Heard, of Devonshire Street, Lambeth, Chemist, a patent "for a certain improvement, or improvements in illumination, or producing artificial light," was

granted on the 12th of February, and the specification was deposited in the Inrolment Office, on the 12th of August.

This patent is one of rather a singular nature, inasmuch as it claims for the patentee the exclusive right to use all substances which have not been hitherto used in the production of gas for artificial illumination, among which he enumerates graves, kitchen-stuff, the hoofs and horns of animals, the substances left after the extraction of vegetable oils by pressure, commonly called oil-cake, to be used either separately, or in combination with each other, or with different substances not enumerated, as circumstances may render more advantageous.

During the manufacture for coal gas, after the process has proceeded so far, that only the light carburetted hydrogen gas is disengaged, Mr. Heard proposes to introduce into the retort a quantity of oil-cake, or other substances of that nature, for the purpose of obtaining from the ingredients an immediate discharge of the heavy carburetted hydrogen gas, which affords a much greater quantity of light than the lighter gas.

This patent would be very much in the way of effecting improvements in the production for hydrogen gas for the purposes of artificial illumination, were it not that the patentee claims the privilege of obtaining the gas by the *most economical means*; therefore, if any other person should discover a method of producing gas more economically than Mr. Heard, he ceases to comply with his patent, as his method then ceases to be the *most economical.*

Boot Heels and Tips.—To Robert Porter, of Carlisle in Cumberland, Iron Manufacturer, a patent, "for a certain improvement, or improvements in iron heels or tips for boots and shoes," was granted on the 13th of June, and the specification was deposited in the Inrolment office on the 13th of August.

The improvement which this patentee seeks to obtain by his invention, has for its object to render the iron heels or tips of boots or shoes lighter, and at the same time more durable than those usually employed. This object he obtains by making them thicker at the places which are more subject to wear, and thinner in those places which are less subject to wear. Economy in the manufacture of an article of general use amongst that class of society whose circumstances preclude the possibility of their paying high prices for common necessaries, such as the one under consideration, is an object of the greatest importance, a circumstance which Mr. Porter has not overlooked; as he has contrived rollers with irregular groves cut

in them, to give to the different parts of the piece of metal the required thickness before it is bent into the form of the heel or toe of the boot or shoe. Into these rollers are fixed projecting studs which mark, or pierce nearly through, the holes for the nails or screws by which the heels or tips are to be fastened to the boot or shoe.

Malt Kilns.—To Thomas Salmon, of Stokeferry, in Norfolk, maltster, a patent "for an improved malt kiln," was granted on the 9th of July, and the specification was deposited in the Inrolment Office on the 13th of August.

"An improved malt kiln" is a title which we would recommend to the attention of our inventive readers; and it may be presumed, from its simplicity and intelligibility, that it did not cost the patentee a professional fee for *settling* it; or in other words, for encumbering it with a useless, an obscure, and inaccurate phraseology, such as, 'for a certain improvement, or improvements in, or for, or applicable to,' &c.

Mr. Salmon's invention consists in admitting a portion of the hot air from the flue into the part of the kiln above the malt, during the process of drying, instead of causing all the hot air to pass through the malt according to the customary practice: and the object of this arrangement is to promote the evaporation, and to carry away the moist air instead of allowing it to be again condensed and deposited on the surface of the malt.

The grain floor of the kiln is made, in the usual way, of perforated tiles or iron plates. These perforations, which are very numerous, to admit the passage of the hot air through the malt, are not so large as to allow any of the malt to pass through the floor: and the hot air is admitted into the upper part of the kiln through larger openings furnished with tubes, or small flues which extend higher than the surface of the malt on the floor, and thus a portion of the hot air is conveyed in a dry state to the space above the surface of the malt.

Application of Heat.—To Joseph Rayner, of King's Square, St. Luke's, London, civil engineer, a patent "for certain improvements in apparatus and machinery for conducting heat, and applying the same in the operations of washing, scouring, cleansing, fulling, dressing, dying, and finishing woollen cloths; and in callendering, straining, glossing, polishing, and finishing silks, cottons, linens, woollens, and all other goods to which the same may be applied," was granted on the 5th of February, and inrolled in the Rolls Chapel office on the 5th of August.

The improvements contemplated by this patent, are the application of hot water or other fluid circulating through pipes, to the various purposes above enumerated. The water is heated in a strong cylindrical boiler with spherical ends, placed vertically over a furnace of the usual construction with a flue ascending spirally round the boiler, to economize as much as possible the fuel. The pipes which convey the hot water or other fluid from the boiler to the place where the heat is to be applied, proceeds from the top of the boiler, and communicates with a heating vessel; and the pipe which brings back the water from the heating vessel to the boiler after it has parted with a portion of its caloric to the material to which the heat is to be applied, enters at the bottom of the boiler: and thus, as the hot water naturally ascends, and the cold water naturally descends, a continued circulation through the boiler, the pipes, and heating-vessel, is obtained. The circulation of the water would cease, were its temperature to become uniform throughout the boiler, pipes, and heating-vessel, but that can never take place during the operation, as a portion of the heat communicated to the water in its passage through the boiler will be abstracted during its passage through the pipes and heating-vessel, which is always to be placed higher than the boiler. The whole apparatus is kept constantly full of water, by its connection with a cistern situated considerably higher than the boiler.

Mr. Rayner's method or methods of applying heat through the medium of circulating hot water to all processes connected with the manufacture, cleansing, and dying of fibrous substances requiring a "mild and soft heat," is described in his specification at great length; but, as he does not claim any one of the methods which he minutely details, it will be sufficient to describe them here very generally. In all cases where it is to be applied to fabrics placed in liquids, as, in the operations of cleansing, scowering, dyeing, &c., double vessels are to be employed, and the spaces between the exterior and interior sides and bottoms of the vessels are made to communicate with the pipes, and to form a part of the circuit through which the hot water passes: but when it is to be employed in the operations of dressing, callendering, glossing, polishing, and finishing woollen or other cloth, the water is to be introduced into the hollow metallic revolving cylinders, passing through the axes on which the cylinders turn; and these axes are provided with stuffing boxes, to prevent the escape of the water. The application of this method of communicating heat to manufacturing processes, such as the making of gunpowder, where the proximity of fire would render the operations dangerous is also claimed by the patentee.

On reference to the third volume of the present series of the

Register of Arts, it will be seen that Mr. Fowler, of Great Torrington, Devonshire, specified on the 2nd of April last, a "patent for improvements in applying heat by the circulation of hot water," on precisely the same principles as the patent before us. Nor is this the only instance in which the same thing has been patented by different individuals at an enormous expenditure of time, talents, and money, arising from the ignorance of parties of what has already been effected. There are indeed, within our own knowledge, numerous instances of this nature, which show the great importance of a *descriptive list of all the patents as soon as they are inrolled*, such as we are now enabled regularly to furnish to the public.

Window Frames, Shutters, and Doors.—To William Henry Kitchen, of High Street, Bloomsbury, ironmonger, and Andrew Smith, of York Terrace, Westminster, machinist, a patent "for certain improvements in the construction of window frames, sashes or casements, shutters and doors, designed to afford security against burglars, as well as to exclude the weather," was granted on the 7th of February, and the specification was inrolled in the Rolls' Chapel Office on the 7th of August.

The improvements in window frames which has for its object the better protection against wind and rain, and the better security against burglaries, consists in an apparatus by which French casements can be securely fastened, and at the same time rendered nearly air-tight at the place where the two casements meet in the middle of the window. This is effected by introducing into a groove, moveable bars, which are forced out when the windows are shut into a similar but more shallow groove in the other casement, so that half the bar may be in each groove. The bar is separated in the middle where the handle is attached to the casement. To the ends of the upper and lower portions of the bar are attached racks, which cross each other within the style of the casement at about rightways; and these racks are acted upon by a pinion fixed upon the axis of the latch handle, so that when it is turned to fasten the window the upper portion of the bar is forced out in a direction sloping upwards, projecting not only into the groove in the opposite casement, but like a bolt into an aperture in the top of the window-frame, while the lower portion of the bar is forced out in a direction sloping downwards, and projects like a bolt into a similar aperture in the window-sill. The bars are guided out parallely by small bolts fixed in the casement, and fitting into angular slits in the bars.

The improvements in shutters consist in alteration of the arrangements and operations of the apparatus connected with the *patent*

metallic shutters described at length in the second volume of the new series of the *Register of Arts*. Instead of the shutters being raised and lowered by cords or chains passing over pulleys as there described, the present patentees propose to employ screws extending from top to bottom on each side of the window. A simultaneous motion is effected in the screws by means of a bar extending across the bottom of the window, and connecting by bevel wheels, both screws with a winch handle, by which they are turned. Upon the screws are fitted nuts, to which are attached the shutters, and therefore by the operation of turning the handle the shutters are steadily and silently raised in front of the window, or lowered into their case. The patentees mention some variations in the construction of this apparatus, such as endless chains passing over spiked wheels instead of the screws for raising the shutters, or instead of the bars and wheels for transmitting the motion from one side of the window to the other.

Their proposed improvement in doors consists in the use of iron plates, which are made to constitute the door, to which the hinges and lock are attached: upon the iron door thus formed are fixed wooden styles on each side, the iron being left uncovered, except by paint, to form the pannels, producing the appearance of a neatly-framed door of the usual construction. One of the objects pointed out by the patentees is security against fire, for, though the styles might be burned off, the door would remain securely closed, as its hinges and fastenings are attached to the iron.

There are two other subjects mentioned in this specification connected with doors : the first is, to make a slip fitted along the bottom of a door to press upon the floor, when the door or window, if it be applied to one, is shut, which is effected by a projection from it coming in contact with the door-post, and when the door is opened the bottom slip is lifted up from the floor by a spring.

The second subject is applied to the lock, and consists in the introduction of a kind of pinion acting on racks connected with four bolts, which are projected out, or withdrawn by a single turn of the key. One of the bolts is projected into the post, from which the door opens, another into the post on which it is hung, and the other two into the top and bottom framing of the door-way.

It will readily be perceived that many of the contrivances which have been noticed display considerable ingenuity; but the patentees have not always taken the readiest methods of carrying their designs into effect, as they have employed racks and pinions on several occasions where simple levers would have answered the purpose, and have

been less expensive and less liable to derangement. The projection of four bolts by the same operation has been known for several years.

OPERAMETER.—To Samuel Walker, of Beeston, Yorkshire, cloth-manufacturer, a patent "for an improved apparatus, which he denominates an operameter, applicable to machinery for dressing woollen and other cloths," was granted on the 20th of February, and the specification was inrolled in the Rolls Chapel Office on the 18th of August.

The object of this invention is, to register the number of strokes or the number of revolutions in any piece of machinery connected with dressing cloth, and the advantages which the patentee points out, are two-fold. In the first place, it will form a check on the quantity of work done by the men employed, and in the second it will enable a manufacturer to adjust his shearing, dressing, or other machinery; so that any given portion of cloth shall be submitted to an assigned quantity of shearing or dressing; and hence work of any required quality may be produced without being dependant on the fidelity or attention of the workmen.

The train of wheel-work constituting Mr. Walker's operameter may be varied, as stated by the patentee, according to the purposes to which it is to be applied; but the one which he describes in his specification consists of the endless screw-gearing, which is well adapted for giving a great extent of numerical indications, with a small train of wheels. But, as the patentee does not claim any particular kind of counting machine, but simply its application to the above purposes, it has been deemed unnecessary, on the present occasion, to enter more minutely into its details.

HOWARD AND HODGSON'S IMPROVED MODE OF PREPARING AND REFINING SUGAR.

THE patents that were granted to the late Hon. Edward Charles Howard (brother to the late Duke of Norfolk), for a new mode of refining sugar, and afterwards to Mr. Thomas Hodgson for practical improvements upon the theory of Howard, having recently expired, it has been one among the many things we have proposed to ourselves to do, to give as full an account of the process as we might be enabled to procure. As far as the mechanical arrangements were necessary, these have been furnished to us unexpectedly by Messrs. Oaks and Son, the coppersmiths and engineers of Houndsditch, who have prepared as a circular, to persons concerned in refining, a description of all the apparatus used, which they are well qualified to do, having been chiefly employed in the mechanical construc-

tion of them at the principal refineries in London. The drawings which accompany Messrs. Oake's account are most ably executed, and give, without doubt, a very accurate representation of the whole interior of a refinery, in which this process is adopted, in its present state of improvement. On reference to the descriptive account, which occupies nine pages, folio, we were much disappointed by the confused and almost unintelligible manner in which it is put together, which is much to be regretted, as it required only the aid of a person possessing a little scientific and literary knowledge to arrange and rectify the matter. Messrs. Oaks and Son are, unquestionably, very skilful engineers and manufacturers, and they would have acted wisely, and more to their own interest, had they employed a competent person to write an explanation of the process and of the drawings. It is a singular circumstance that throughout the whole paper the principle on which the operation is conducted is not even mentioned; and as the drawings do not include a section of the vessels, we are under the necessity of obtaining this most important part of the information from other sources. To satisfy ourselves on this point, without depending upon our memory, we have referred to Dr. Ure's Dictionary, where we find under the article *sugar*, p. 730, the following concise explanation of the principle.

" In the ordinary refining of raw sugars from twenty to thirty-five *per cent.* of molasses are separated, of which a considerable part, probably two-thirds, are formed by the high heat used in the concentration of the syrup. Various plans have been contrived to diminish this production of molasses. One of these consisted in surrounding the sugar-boiler with oil or *steam* at a high temperature, instead of exposing it to a naked fire. In a second the boiler is covered at top, and by means of an air-pump the atmospheric pressure is removed, so as to favour ebullition, and rapid evaporation, at moderate heats.

" The celebrated chemist, Mr. Howard, took out a patent for this plan, which is undoubtedly the most scientific and productive of any, but requires superior skill and very minute attention in the manufacturer. No blood is used for clarification This is accomplished by a system of most ingenious canvass filters, aided by the intermixture with the syrup of a small quantity of pasty gypsum and alumina, made by saturating a solution of alum with quick lime. In the final purification, the base of the inverted sugar-cone is covered with a stratum of very pure saturated syrup instead of moist pipe-clay."

From the foregoing, we learn that the vessels represented in the drawings, which are employed to boil the saccharine matter, are made double, being surrounded by casings filled with steam; and to accelerate the evaporation without increasing the temperature the boiling is effected in vacuo.

The refining of raw sugars by this process has, we are informed, been so extensively practised by many refiners in this country, and so profitably, as to have enabled them to pay the proprietors of the patent, for the privileges of using it, no less a sum than £300,000,

but we have never heard of its having been applied to the preparation of sugar *from the cane-juice;* and it is to this particular application of the process, that the efforts of Messrs. Oaks and Son are directed, as would appear from the tenor of their circular. If, in operating upon raw sugar, a less quantity of molasses, and a purer crystal results by this process than by others, it seems to follow, that similar or greater advantages would flow, by the preparation of raw sugar in the first instance from the expressed juice of the cane. Viewing the subject in this light, we are happy to have it in our power to second the views of the Messrs. Oaks by placing the matter before our colonial readers, and in calling the attention of sugar-planters to a due consideration of the process, which is, in our opinion, one of great economy in every point of view.

Having said thus much, we proceed to give some account of the apparatus, represented in plate 3, fig. 1, premising that it is only one among several others with which Messrs. Oaks and Son have favoured the refining part of the public.

This figure represents a vertical section of the sugar boiling-house, with an elevation of the various utensils and apparatus, of which the following is given :—

" *a* clearing-pans of copper, made in one piece, containing each about 400 gallons, with cast-iron cases, bolted together, having two inlet valves, marked ×, from steam-main, air-cocks, condense conveyance, and the connecting pipes to main of filter.

" No. 1 is the main from mill and engine, to command the clearing-pans, with a charging-cock to each.

" *b* the filter; a copper box, containing about sixty-five leaves of copper, giving a great surface to filtration, the texture of the drill with which they are covered so fine that no impurities can pass; the filter is supplied by main cocks connected from clearing-pans by the connecting-pipe to pressure-main; each filter has air-cocks, foul cock, clearing-cocks, cold water or cleansing cock, and steam-cock. When properly packed, the best filter known at the present day, quickly cleansed, the feculence serves for manure, and, with common attention, easily governed.

" *c* are receiving-cisterns, made of copper, and containing each about 400 gallons, with drawing-off pipe and cock, to command measure, placed either under or aside filter. The filters are supported on frames, with trough, &c.

" *d* are the vacuum-pans, of copper, supported by columns, and fixed to stage, with proof-stick, thermometer, barometer, man-hole, and steam-plug, connecting arm to air-pump and injection-cock, air-cock, discharging-plug and lever, condense water conveyance to syphon, measure and charging-cock. The pans contain up to flange 100 gallons, and of granulated sugar about 11 cwt. each.

" *e* the heaters of coppers, made in one piece, with cast-iron case, bolted together, containing about 350 gallons, or of crystallized sugar, say 35 cwt. with steam-valves ×, air-cock, and condense conveyance to syphon, surrounded either with brick or wood-work."

As we do not give any other drawings than the one just described, it is proper we should explain what the others consist of, in order that the reader may form a tolerably correct idea of the nature and extent of a cane-juice sugar factory, conducted on Howard's plan.—

On the same floor as the boiling house we have represented, is *the curing house*, which is a large building, in which numerous hogsheads are placed upon strong timbers with open joists, and having underneath, a large cistern extending over the same areas as the hogsheads, for the reception of the molasses: when the saccharine matter has from the boiling arrived at that degree of concentration as to granulate, it is removed into these hogsheads, therein the crystallization takes place, the molasses draining off through holes at the bottom of the hogsheads into the large receiving cistern underneath.

Another plate exhibits a vertical and longitudinal section of the establishment, in a line at right angles to that we have described, and brings into view, *the mill-house*, and *the engine-house*. In the explanation of which, it is stated, that "the mill-house generally contains two mills *, worked either horizontally or vertically, with base and connecting shaft to engine, suction-pipe to pump to supply clearing-pans, with door-way for conveyance of cane trash for fuel of steam-boilers." The engine-house is stated to be supplied with a six or eight horse engine, on Bolton and Watt's principle, the air-pump of which is employed to exhaust the air from the sugar-pans.

The next plate gives several views and sections of the steam-boilers which supply the steam to the engine and pans; and the last gives a grand plan, shewing the arrangement of the whole.

To the explanations of the foregoing, which are given as briefly as possible, succeed the following

"*Remarks.*—The air-pump can be attached to any engine, and is, by the improved plan, placed in the cistern of the steam-engine, and is the most perfect and commanding of any mode of obtaining a vacuum; the pump may be worked by any other power, but, as steam must be employed, it is preferable to suppose it the moving power.

"The mill should be elevated, to command clearing-pans, and save the power of pumping, which, by imbibing air, has a tendency to create acidity and fermentation.

"The common return of a sugar-mill is 500 gallons per hour, which if worked twenty hours out of the twenty-four, will return 10,000 gallons, equal to 36 hogsheads of sugar of 16 cwt. each, in six days, which is the product of each mill during the crop.

"As quick grinding is necessary as soon as the canes are cut, to prevent their becoming tainted, no power is so constant as the steam-engine, and, where they can obtain water, superior to all mills worked by water, wind, or cattle.

"In vacuum-pans, the temperature of the granulating point is 145° to 150° Farenheit, and supports a column of 26½ inches of

* These mills are of course for crushing the canes, and thereby expressing the juice, they have been described in our early numbers.

mercury. The barometer is graduated as nearly as possible to correspond with the thermometer; the vacuum not being perfect, there is generally a difference of five degrees, which is of no importance. The pans are proved before delivery, which is the only apparatus of importance, and are fixed upon a frame ready for action, (save the connection to air-pump, steam, and condensed water) the same as regards the other apparatus. The pans are cleansed by steam occasionally.

"In the heaters, the temperature is raised to 175° or 180°. The steam is on the utensils the whole of the time, not being turned off at each operation. The pressure of the steam is about 6 to 7 lbs. per square inch;—more no objection,—less retards the operation.

"The water calculated for injection to each pan is 320 gallons per hour, which supplies itself by action of the pump on pans from the cold water cistern of engine.

"A steam-engine of moderate power requires five gallons per minute for each horse power.

"The consumption of fuel for boilers of the herein-mentioned plan is about 6½ chaldrons per week, taking eighteen hours on an average for consumption out of the twenty-four, allowing 10 lbs. per hour for each horse, and averaging the bushel at 84 lbs. weight, which will be found correct for boilers on this principle.

"The fire-place and flues are capacious, and of an oval shape, and adapted for cane-trash and fuel of any description: the safety-pipe is adopted in lieu of valve, so that no danger can possibly happen.

"Each boiler is sufficient to command the whole, and equal to eighteen-horse power, and sufficiently strong, (to generate steam up to 20 lbs. to which they are proved,) and should be cleansed once a month, and used alternately every week." Then follows

"*The Mode.*—The cane, being crushed in the usual way, is conveyed to the clearing pans, and, when once properly filled, the cock is turned off to command another; into the one filled is thrown a small portion of animal charcoal,* and, if needful, a small quantity of the best white lime,† ready diluted; it is then well stirred, and raised to a temperature of about 200°, and the first scum removed, which, at the pressure of 7 lbs. steam, it will quickly attain, the liquor being so thin; at which period it is turned on to the filler, from whence it is conveyed into the receiving cistern, pure and

* "Seven and a half lbs. to every 100 gallons of raw liquor, properly prepared. Animal charcoal absorbs colour, corrects acidity, and facilitates filtration, &c. and is used by all refiners.

† "One lb. and a half of the best white lime, ready diluted, to every 100 gallons. In some parts of Jamaica, where the cane-liquor was exceedingly rich, good sugar has been made without a particle of temper.

"Every time the clearing-pans are re-charged, five lbs. less of animal charcoal: the said pans may be charged as many times as the filter will run, before they are cleaned out; whereas, if the quantity of charcoal was added to what may have settled, the liquor would become too much saturated.

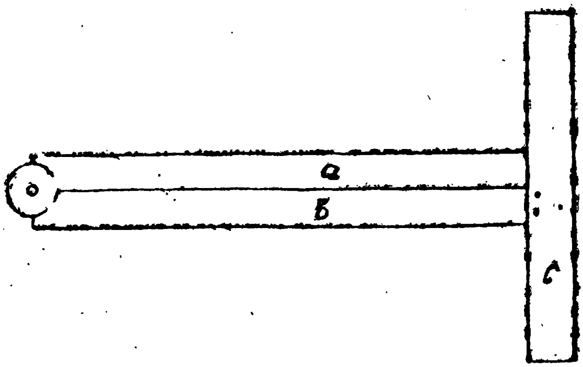
"There are two clear-pans to each filter, to prevent delay, which are to be brought forward as required: a little practice will determine all these points.

transparent, and ready for boiling. The liquor is, as required, drawn off into the measure which supplies the vacuum pans, and rapidly boiled to its proper consistency, at 150° to 175° Fahrenheit, taken by an instrument, termed a proof-stick, discharged into the heater, and by the time they are full, which will be in three skippings, the whole arrives at 180°, the granulating heat, and, being slightly stirred, is ready to be immediately removed into the hogsheads in curing-house,* where, in one-fourth of the time necessary in the old method, it delivers itself of its natural portion of molasses by precipitation, which, accelerated by having the curing-house heated by steam-pipes, and then ready for shipment. The molasses thus drained is of the first quality, for whatever purpose it may be applied. This closes the process.

USEFUL DRAWING INSTRUMENT.

Chancery Lane, August 16, 1829.

SIR,—In making mechanical drawings of the actual size of machines, or in reducing them to another scale on paper from their true measurement, the use of a two-foot rule is a great convenience, and the necessity of having recourse to many instruments, I have often found to be as great an inconvenience. To reduce their number, I made a slight addition to the common rule, by which I preserve the full use of it, (and its scales) and have besides a good square, a bevil and a pair of calippers; a combination that embraces nearly all that is essential, and enables a draftsman to take, and lay down, his measurements with great facility and dispatch.



a and *b* represent the two limbs of the rule; to the extremity of the limb *b* is glued and rivetted the cross piece *c*, which is only rather more than half the usual thickness, or about three-eighths of an inch; the limb *a* is fastened in a similar manner to another piece exactly

* "Or remove every boiling, in which case the heaters may be considerably lessened in depth, and give more surface and despatch.

corresponding with *c* at the back of it, and so as to shut against each other, as a two-foot rule does, when not fixed.

When the rule is closed, it forms a perfect T-drawing square, screws to measure with, and lay down any thing to the real dimensions, or to a reduced size by the scales on the rule. By opening the rule, you can measure and draw lines to its full extent of two feet, and, if there is a slide to the rule, two measures may be taken, and laid down together, which is a great convenience and preventive of mistakes being made. The cross ends *c*, when inclined to each other, as in opening the instrument, serve to take some angles, and the broad joint at the other end of the rule is useful in taking others. And it is evident that the extremities of the cross pieces may be brought to embrace and measure the diameters of round bodies, all the purposes of a large pair of callipers are answered thereby. In short, I find this trifling contrivance of an idle hour so useful, that I could spin you a long yarn in descanting upon its merits, but as all your readers are not draftsmen, (though all draftsmen are, or ought to be), I will here close my letter by simply recommending my instrument to the use of all whom it may concern.

I remain, your constant reader,

THEOPHILUS LINDSAY, M. D.*

A NEW MODE OF HEATING APARTMENTS.

SIR,—THE paper which I had the honour of addressing to you on the subject of heating apartments, and which appeared in the Number for August (Part 25), page 23, having, as I observe from your notices to Correspondents, been illustrated by drawings made from memory, in consequence of the engraver having mislaid the originals, I beg your attention to the accompanying sketches: First, because the figures 10, 11, 12, and 13, given in plate 2, of Part 25, do not agree with the printed references to the engraving, in the description, where they run in the order of figs. 1, 2, 3, 4, 5: and secondly, because the figs 10 to 13 are quite incorrect, and represent an apparatus which it would be impossible to manufacture.

The annexed diagrams (with the references to figures 1 to 5, on page 24 of the Number before alluded to) will fully explain the nature of this heating apparatus.

The following is a memorandum of experiments made in February 1828, with one of these air-heaters, formed of copper.

At Mr. G.'s—the room door shut during the whole time.

1. Temperature before using the apparatus, 54°.
2. ....Do.... half an hour after using ditto, 62°.
3. ....Do.... in about one hour, on holding a chemical thermometer within the tube, (Fig. 1. *h*.), without touching the metal with the bulb; the mercury rose to 254°.

* Quere. Do the initials M. D. stand for Medical Doctor, or for Mechanical Draftsman?

4. A thin slice of beef, on a small plate, placed within the hood, was completely cooked in thirty minutes.

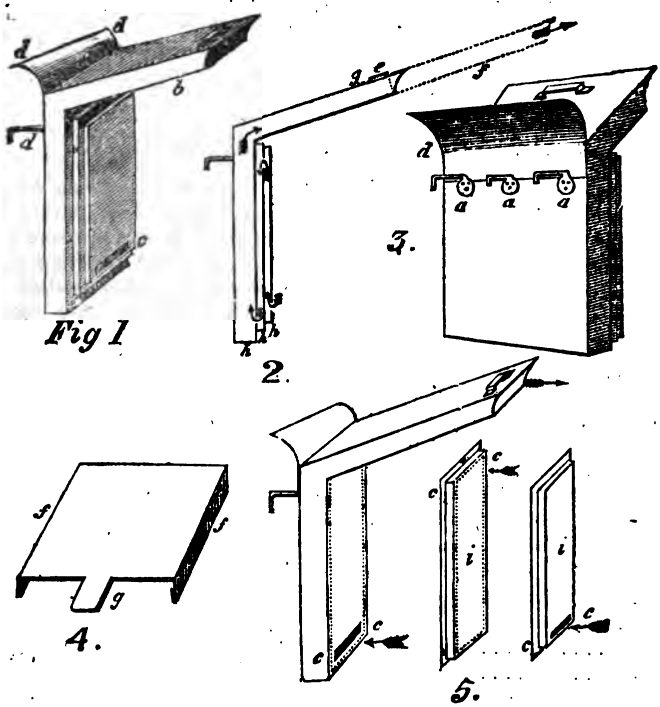
At Mr. G.'s—11th February.

1. Temperature of the room, 54°.
2. In the course of an hour the temperature was between 62° and 64°.
3. The bulb of a chemical thermometer being held close to the edge of the additional plate, the mercury, in the space of one minute, showed 160°; and, in three minutes, it indicated 160°.
4. A thermometer, about two feet above the edge of the additional plate, and in the stream of hot air issuing from under it, rose to 74°.

I remain, Sir,

Your's, very truly,

H. D.



TRANSACTIONS OF THE SOCIETY OF ARTS, &c.

FOR THE YEAR 1828.

The annual volume of this Society made its appearance so much later than usual, that we were unable to notice its contents previous to our last number, which contained descriptions of two of the inventions that had received the Society's premiums. We now propose to give a summary account of the whole of the contents, reserving to a future opportunity, the enlarging upon any of the subjects it embraces.

PLANTING FOREST TREES.

The *large gold medal* was voted to Lord Newborough, for having planted 3,738,000 of forest-trees, of which a fair proportion are oak, to stand for heavy timbers. These plantations are situated in Caernarvonshire and Denbighshire; for the most part, on mountainous, or other ground, not adapted for more valuable crops. From the remarks contained in the margin of the planter's book, the following conclusions may be drawn:—

That exposure to the prevailing sea winds, on the western coast, is highly injurious to young plantations; that, if a very dry summer succeeds the autumn and spring planting, a considerable proportion of the young trees, especially of the pinus genus, will perish, although such dry season will probably be by no means injurious to trees a few years old; that, although plantations will rise tolerably well on land imperfectly drained, other circumstances not being unfavourable, yet it is highly detrimental to them when exposure to the sea wind is superadded; that plantations, in other respects favourably situated, are injured by grasses and weeds over-topping the young plants, and, that many perish when this circumstance is *combined with imperfectly* drained soil.

A NEW ESCULENT VEGETABLE.

The *Silver Ceres Medal* was presented to Joseph Houlten, Esq. of Lisson Grove, for the introduction to public notice of a new esculent vegetable. The stachis polastris, or March-all-heal, is a plant not unfrequently occurring on the sides of ditches, or moist rich cornfields; it increases rapidly by creeping roots, and forms on these during the summer, a number of thick, half-tuberous buds from which the stems of the next year are to arise. From the end of autumn to the close of winter, these tuberous buds abound in a mild, somewhat sweetish, farinaceous matter, fit for domestic use. The plants and roots are figured in Curtis's Flora Londinensis; but Mr. Houlton has the credit of having first suggested its use as an esculent vegetable, and of having made some experiments in the way of cultivating it, he proposes to call it *Panace*.

The roots of this plant taken up in December and January, are from six to ten inches in length, and, when boiled, are similar to asparagus in flavour; they are very tender, having no hard fibres, and

require boiling but from twelve to fifteen minutes to render them fit for the table; in the raw state, they are very brittle, and free from any unpleasant flavour.

The cultivation of this plant is very simple, and attended with comparatively no expense, and it produces plentifully: being indigenous, it is easily obtained.

In the month of March, the roots should be taken up, and divided into portions, each containing two or three joints. These should be planted at not less than twelve inches from the surface, in a light, rich soil, and in a moist situation. Mr. Houlten is of opinion that the size of the roots might be considerably increased by careful cultivation. It is probable, that many situations, which now produce nothing but weedy herbage of the coarsest kind, may be profitably cropped with *panace*.

APPARATUS FOR INSTANTANEOUS LIGHT.

The *Silver Iris Medal* was voted to Mr. George Jackson, of No. 30, Church Street, Spitalfields, for his improved apparatus for obtaining instantaneous light. The singular fact that platina, in a state of very minute divisions, is capable of becoming red hot when exposed to a stream of hydrogen gas, and then of inflaming the gas itself; was first discovered by Dobereiner. The construction of an apparatus whereby this property of platina is applied to the purpose of lighting a taper is due to Gay Lussac. The modifications now introduced by Mr. Jackson, render the machine more simple, and of greatly reduced cost in the manufacture. Mr. Jackson thus describes its construction:

"The instrument which I have the honour of laying before the Society, consists of an inverted syphon, made of stout glass tube, about half an inch outside diameter, having a ball, about two inches and a quarter diameter blown on each leg. The bend of the syphon is cemented into a wooden foot, loaded with lead, and the ball on the longer leg stands about six inches, measuring from centre to centre, above that on the shorter one. The tube extends about an inch above each ball. That from the upper one is simply covered with a loose brass cap, more for ornament than use. On that which rises from the lower ball, a brass cap is cemented, into the top of which a brass plug is ground, with a hole drilled across it, met by another drilled up the centre, so as to form a stop-cock. A jet with a fine orifice is screwed into the side of the cap, so as to communicate with the lower ball through holes in the plug, when the latter is turned; and just below the jet an arm projects, which carries a short piece of brass tube, lying horizontally, that serves to support the platinum, and protect it from accidental displacement. The end of a thin platinum wire is formed into a small helix of two or three turns, by bending it round a wire or glass rod, and is covered with moist ammonia-muriate of platinum. It is then heated to redness in the flame of a spirit-lamp, again coated with the ammonia-muriate, and again heated, so as to form a platinum sponge, from the size of a pepper corn to that of a pea. The wire is then attached to a ring,

made of brass tube, of a size to admit of being pushed tightly into that which is supported by the arm; so that the platinum sponge hangs in the centre of the tube, directly before the jet. In the arm above-mentioned, between the jet and the platinum, and a little to the side, is a hole just large enough to contain a piece of wax taper, the wick of which is thus placed so as not to obstruct the jet of gas, but yet near enough to be lighted when the gas is inflamed. In the part of the tube between the bend of the syphon and the lower ball, a cork grooved at the sides, is inserted, to prevent the zinc from falling into the bend.

"To charge the instrument for use, the brass plug is taken out, and a number of narrow slips of zinc, about two inches long, cut from a piece of the thin malleable metal, are introduced into the lower ball, which is then nearly filled with diluted sulphuric acid, poured through the upper orifice. As soon as a brisk action commences, the plug is replaced, and the gas, accumulating in the lower ball, drives the acid into the upper one, when the production of gas ceases. The lower ball being thus filled with hydrogen, on turning the plug, a portion of it escapes through the jet, becomes ignited by its action on the platinum sponge, and lights the taper, a portion of acid at the same time descending from the upper ball, acting on the zinc, and causing a fresh production of gas. It is not very material how much the acid is diluted: that which I have used is made by mixing one measure of oil of vitriol with about ten measures of water, and it answers very well.

"In the instrument in the Society's possession, the upper ball is about six inches, (from centre to centre) above the lower one. I have since made one wherein the distance is only four inches, and I think it lights with rather less expenditure of gas.

"To prepare the ammonia-muriate of platinum, a solution of the metal in nitro-muriatic acid is dropped into a solution of muriate of ammonia, in distilled water, and the yellow precipitate is collected on a filter. Should it become dry, it must be moistened with *distilled* water."

a, the stopper through which the zinc is introduced into the bulb *b*; it is prevented falling lower than *c*, by a notched cork placed within. Diluted sulphuric acid is poured in through the bulb *d*, till it fills the bulb *b*; the stopper *a* is then put in, and, as the hydrogen gas is generated, the liquid is forced down through the bottom *c*, into the tube *e* and the bulb *d*, so that none remains in contact with the zinc. The stopper *a*, also forms the cock, it being hollow, and on turning its lateral aperture opposite the jet *f*, the gas is pressed out by the weight of the fluid in *d* and *e*, and blows against a piece of spongy platina suspended by platina wire, in the short tube *g*; the platina becoming hot, kindles the gas which heated it, and this flame lights the wax taper *h*, which is struck in a hole in the arm *i*; this hole is so much on one side of the jet as to let the wick only just touch the flame; the arm *i*, which holds the taper, is soldered to the brass neck *j*, and to the tube *g*.

PURIFICATION OF VEGETABLE OILS.

The *Silver Isis Medal* was voted to Mr. Cogan for his method of purifying linseed and rape oils. The process is given in our last number, page 27.

SUBSTITUTION OF PREPARED PLUMBAGO FOR OIL, IN DIMINISHING FRICTION IN DELICATE MACHINERY.

The *Gold Isis Medal* was awarded to Mr. L. Hebert, of Queen Street, Chelsea, for his application of prepared plumbago instead of oil, in diminishing the friction of the rubbing parts of clocks. Every one is acquainted with the effect produced by oil or grease in diminishing the friction of those pieces of machinery that are in common use; a stiff-going lock, and a creaking hinge, are both rectified by the application of a few drops of oil. But by long exposure to the air, oil is more or less changed; it becomes rancid and thick, and an acid is developed which corrodes, more or less, the surface of brass, copper, or steel with which it may be in contact; it also detains all those little motes or filaments with which the air of inhabited places is filled, that may happen to touch it; and thus, in no great length of time, becomes foul, and requires to be renewed. All those instruments that, by the equable revolution of their parts, are intended to measure the lapse of time, are seriously affected in the regularity of their going by the progressive thickening of the oil by which the pivots and other rubbing parts are lubricated. Attempts have been made, but with no very great success, to retard this tendency of the oil to decomposition: and in the higher priced clocks and chronometers, the use of oil has to a certain degree been dispensed with, by making the caps and holes in which the steel pivots turn, of ruby, or other hard and highly polished gem. Still, oil, or something equivalent to it, must be employed in some parts; and in proportion as the mechanism of clocks approaches nearer and more near to perfection, it becomes of increasing importance to avoid the use of a substance that cannot be employed without introducing a cause of error, always increasing till it affects the rate of going, and renders it necessary to take the instrument to pieces in order to clean it, and renew the oil. Plumbago, or as it is usually called, black-lead, is a soft, unctuous-feeling substance, which readily takes a high degree of polish, and therefore is well qualified, when interposed between two rubbing surfaces, to diminish greatly their mutual friction: it is also perfectly unalterable by exposure to air, has no chemical action on substances at any atmospheric temperature, and readily adheres, by a slight degree of rubbing, to any surface to which it may be applied. Alone, as well as mixed up with oil or grease, it has been extensively used for lubricating machinery, the mixture forming the anti-attrition paste, used with such good effect in the axle-trees of carriages. But even the finest plumbago, such as is used for the best black-lead pencils, contains certain hard gritty substances, which would prove highly detrimental in fine machinery. It is there-

fore submitted by Mr. Hebert to the process detailed in the following extracts of a letter addressed to the Society.

"Sir,—Permit me to offer you a few observations upon a subject which fifteen years of experience have produced, namely, the substitution of plumbago for oil, in the rubbing parts of chronometers, in order that they may be laid before the Society of Arts, and thus, if approved, become beneficial to the world at large.

"The use of sidereal and mean-time pieces in observatories, at sea or on land, is to measure the motions of the heavenly bodies, and by them ascertain their right ascension in time, their distance from a given point, and to obtain the longitude of places upon the earth. From that the word *chronometer* (measurer of time) is derived; but very few deserve the appellation. Whatever may have been the skill of the maker, and the care he took for their perfect construction, the observer must not expect to find them infallible; and, however well regulated they were at first, they will not remain so permanently: their rate of going will be accelerated or retarded by the temperature of the atmosphere, which causes all metals to expand or contract, more or less, and that, in an irregular degree, will create a variation in their movements; and though innumerable experiments have been tried to render them perfect chronometers, by composing pendulums or balances that might contravene the atmospherical influence, yet none has been found that would accomplish that desideratum; because it is evidently proved, that metals, after having been worked several times by heat and cold, never return to their primitive state at the same temperature.

"But, Sir, this is not the only difficulty chronometer-makers have to combat against: there is another powerful enemy, which is always baffling their success, and that is *oil*. The different degrees of fluidity and quality of that liquid are also great alterants of clock-movements: in hot climes it will become absorbed: in cold weather it will congeal; in both instances impede the freedom of motion. This, nevertheless, may be remedied by a substitute which I discovered about fifteen years ago; and, in order to befriend science, I will here name it, and explain the way of applying it to time-pieces, for the benefit of those who do not mind a little trouble, and have patience enough to go through the process it requires. It is plumbago, which, when carefully used, will last a considerable time without the necessity of being renovated; but much depends upon its quality: it must be of the best, free from grits, and the tenderer the better: a spurious sort would endanger the holes and pivots, causing mischief, instead of preventing it. The purest I could procure was from Mr. Langdon, (the first pencil-maker in London, perhaps in the world), Great Russell Street, Bloomsbury, who, after I had explained to him the purpose it was intended for, considered its choice of the utmost importance, and selected some of the best, which answered my utmost expectation. I applied it to my sidereal time-piece in January 1816, and since that time it has been cleaned three times without the plumbago being renovated: the friction places were only wiped with a fine muslin rag; and now, 1827, it goes as well as

ever. I must beg leave to observe here, that I found then an insurmountable obstacle in charging the jewelled pallets of the escapement with the plumbago; but I obviated that by applying it to the friction-plane of the teeth of the swing wheel; so ever since the clock has gone without oil.

"The process of applying the plumbago is thus:—Take about a quarter of a pound of the purest black lead, the brighter the better; reduce it to a very fine powder in a metal mortar, and, to judge if it is fine enough, take a small pinch of it between your fingers; after rubbing it a few seconds, if it does not feel lumpy nor gritty, but smooth and oily, it is good, and beaten enough; have a glassful of filtered water; take some of the powdered plumbago with the clean blade of a knife, spread it on the water, and stir it well; cover the glass, and let it stand for two or three hours; at the top of the water will be a kind of cream, skim it off with a card, and lay it upon a sheet of paper; when dry, put it in a box, to exclude the dust from it; put the sediment aside; repeat the process with some other water and plumbago, until you have acquired a sufficient quantity of fine powder for your purpose; when the whole of the powder is dry, pound it again in the mortar, or bruise it with the bowl of a silver spoon, upon a clean sheet of paper, and repeat the same process two or three times; if the lead is pure no more sediment will go down; if some does, wash and dry it once or twice more; as soon as no sediment remains, you may be sure that the plumbago dust is pure, and cannot cause any mischief to the pivots and holes; pour some alcohol (the strongest spirits of wine) into a small glass; having wiped the pivots of the wheels and the holes of the plates very clean, immerse them into the spirits, and immediately into the plumbago powder: they will be covered with it; take a small pencil brush, such as is generally used by miniature painters, dip it into the spirits, and fill the pivot holes with it; introduce some powder into them with your finger, by rubbing the plates over the holes till the powder is even with their surfaces; put in the wheel, and make it revolve in the frame for five or six minutes; do the same to every wheel, and also repeat it two or three times; then the holes and pivots will be charged with a thin crust of plumbago, smoother than any polish you can give them; the piece will go twice as long without cleaning as with oil; and truly, if its movement is entirely secluded from dust, there will be no necessity of cleaning it for twelve years, which will be about the time for renovating the plumbago."

Mr. Hebert then proceeds to describe the time-piece to which he applied the plumbago. This instrument being of a peculiar construction, will be read with a corresponding interest by horologists; but, as our limits prevent us from giving it insertion, we must refer them to page 52, vol. 46, of the "Transactions of the Society, &c."

IMPROVEMENTS IN CLOCKS.

The *large Silver Medal* has been voted to Mr. William Meloine, of No. 22, Ironmonger Lane, Cheapside, for his *detached clock escape-*

ment; the *large silver medal* and five pounds to Mr. R. May, of New Road, Deptford, for his *clock escapement*; and the *large silver medal* and five pounds to Mr. T. Judge, of New-end, Hampstead, for his model of a *self-adjusting pendulum*.

It is an axiom in clock-making, that the more perfectly the escapement is detached from the train, the more accurately will the balance or pendulum perform its vibrations, and the more truly will time be measured. One method of effecting this is by means of a rementoire spring, several varieties of which have already been published. Mr. Meloine's and Mr. May's escapements are both of this kind; they are new and ingenious, and, while they do credit to the inventors, add to the resources of the art.

Mr. Judge's improvement relates to another part of the machine. Spring pendulum clocks, especially those with small arcs of vibration, are often found to be out of beat when moved from one place to another, or when set on a table or bracket that is not perfectly level, and, from the same cause, will often stop altogether. Mr. Judge has avoided the inconvenience just mentioned, by supporting the part which carries the pendulum and pallets on the two collets which receive the axis of the escape wheel, and suspending from it a rod, with a weight at its end, sufficient by its gravity to ensure the vertical position of the part to which it is attached, although the clock itself may be upon an inclined plane.

SAFETY RODS FOR BOATS.

The *large Silver Medal* was voted to Lieutenant Ackerly, R. N., for an appendage to ships' boats, especially those of men of war, which, in the event of the boat upsetting, slip out, and offer to the crew means of support, or holding-on, until they are relieved.

"The invention is," Lieutenant Ackerly says, "simply the application of an iron or copper rod, two feet in length, and three-quarters of a pound in weight, having a transverse piece (like the top of the letter T), of seven inches, for the feet to rest upon, when turned upside-down. These rods are proposed to be fitted to whale-boats and galleys, and to the standing thwarts of others, traversing with perfect freedom, at an angle of 25 to 30 degrees, through two small plates, one screwed to the gunwale, the other to the head-sheets or stern-frame, having a place for a firelock, to admit of its being taken out and cleansed. The metallic rod being square, passes through these plates, and is firelocked underneath.

"From the position which the safety-rod occupies, lying on the gunwale, sheltered by the wash streak, it can in no way interfere with the manœuvring or working of a boat, its oars, sails, sheets, masts, or stowage; but it will rather tend to give stability than otherwise. In launches it takes the course of their build, and is cased in. On a boat turning bottom-up, the life-preserver slides out, and affords to persons so perilously situated a firm support to the feet, and thereby the means of husbanding their strength till assistance arrives.

"The advantage to life-boats of the self-acting safety rods, when fitted to their standing thwarts, is that of facilitating their being righted on capsizing."

An experiment with a boat fitted up as above described was tried at Plymouth, in presence of the Admiral commanding in chief at that port, and of several naval captains, who furnished the Society with testimonials in favour of the invention. Notwithstanding the testimony, however, of Admirals and Captains, we cannot help thinking that the *smallest* silver medal, instead of the largest, would have been quite big enough for this very little invention, about which there has been as much parade as if it had been one of great ingenuity and of unquestionable utility. In our humble opinion the safety rods are quite as likely to cause the men thrown out of a boat to be drowned as to be saved. If a man should succeed in getting on one of them, he brings about that very "facility of righting" which the Lieutenant mentions, and, by the act, he is himself plunged again headlong into the sea, after having, probably, nearly exhausted himself in getting hold of the boat. The making of an experiment in a harbour with probably good swimmers drilled to it, is a very different matter to being suddenly capsized in a heavy rolling sea, in the open ocean.

REVOLVING LIGHT FOR STEAM-BOATS.

The *large Silver Medal* was presented to J. Higgins, Esq., for his revolving light for steam-boats, to give timely notice of their approach at night. The Society, in their previous Session, rewarded Mr. Hawks for a contrivance of the kind; but the Society were not then aware that an exactly similar invention was described in the Register of Arts by Mr. Davis, of Kingsland Crescent, twelve months prior to Mr. Hawks's communication. This circumstance was, however, properly acknowledged in the *Preface* to the volume which contained the description.

In the present volume, the Society make the following remarks in explanation of the difference between Mr. Hawks's and Mr. Higgins's plans.

"The necessity of having a distinguishing light for steam-vessels is evident, from the accidents that have occurred for want of such distinction: and the advantage of effecting this by rotatory or revolving lights may be inferred from the medal which was last session voted to Mr. Hawks for such an invention. The plan of that gentleman consisted in placing a light at each end of an arm, supported by the chimney, and receiving its motion from the axle of the paddle wheels. Mr. Higgins's improvement consists in having two opposite fixed lights, one on each side of the chimney, and in placing a pulley at the same height in front of the chimney. From a point in the circumference of the pulley proceeds an arm, bearing the third light, and to this is given a rotatory motion round the axis of the pulley, by connecting this latter, by means of a band, with the axle of the paddle-wheels. The distinctive marks, therefore, of a

steamer fitted up on this plan would be, one light revolving between two fixed ones. For further distinction, the moving light may be of a colour different from that of the two others. A farther advantage in this mode of arrangement would be, that as the lights are placed in front of the chimney, they would not be visible to a vessel except a-head, or on the bow of the steamer, and therefore more or less in a course."

Not having, perhaps, the same kind of optics as the Society, we do not readily perceive the advantage of the lights being invisible to a vessel a-stern. There are some steamers that do not run more than five or six knots an hour, and others that ordinarily make ten or twelve knots, the larger vessels being generally much the fastest. Imagine therefore, the United Kingdom, of 1000 tons, pursuing her course a-stern of the London of 100 tons; the former would, we apprehend, pass over the latter just as easy as a waterman's wherry would glide over a flounder. The Society make another remark on this invention, which appears to us equally curious. Having explained to the reader that Mr. Hawks's invention consisted of two lamps *revolving* at the extremities of one long arm, and that Mr. Higgins had two *fixed* lamps at the end of a similar arm, and in addition, one revolving light at the end of another arm; they observe, "the apparatus is *thus simplified*, and rendered less cumbersome, and, consequently, is more likely to be adopted:" ergo, (they mean to say) the *large* silver medal is due to Mr. Higgins. We could, however, now recommend Mr. Hawks to "simplify" the apparatus still further, by constructing another model with *four* lamps, by which he will be sure to get the Society's large *gold* medal in the next Session.

EXPANDING METALLIC PISTON.

The *large Silver Medal* and twenty pounds was voted to Mr. Robert Mottershead for his expanding piston for high-pressure engines. It is to be regretted that the Society, in rewarding an ingenious workman for his attempts to improve the steam-engine piston, should seize the opportunity to echo the silly observations of interested and prejudiced persons in condemnation of another invention of the same kind, but of vastly greater merit, as well as originality. Mottershead's piston is a mixture of Cartwright and Barton's pistons, having the principal defects of the former invention, and *that very imperfection* which the Society have erroneously attributed to the latter invention, in a *greater degree*, according to their own argument. The following is a copy of the Society's paper on this subject :—

"For low-pressure engines cotton packing is sufficient to prevent the steam from escaping between the piston and the sides of the cylinder; but in high-pressure engines the heat and elasticity of the steam are such as to destroy the accurate fitting of the cotton packing, and thus to necessitate its renewal at inconveniently short intervals.

"Expanding pistons, composed entirely of metal, have accordingly been suggested, have been the subject of patents, and have been brought more or less into use. In one of the best of these the circumference is divided into segments, between every two of which is a triangular wedge, having its point towards the circumference, and its base towards the centre. Each of these wedges is backed by a strong spring, the tendency of which is to force outwards the point of the wedge, and consequently the segments against which it bears. But, in practice, the point of the wedge has been found very liable to mark, and finally to score and destroy the cylinder, against the sides of which it is continually pressing with a force greater than that exerted by the segments.

"Mr. Mottershead's piston is composed of two layers, each of which consists of segments; of these, three alternate ones are pinned so as to form immoveable abutments for the support of the three moveable ones, which are curved internally, and have each a strong spring, placed like a bowstring across the internal curve, and bearing against the sides of a cylindrical cove that fills up the inside of the piston. Hence, it is evident, that these moveable segments are continually pressed outwards by the action of their respective springs. The moveable segments occupy a little larger part of the exterior curvature than the fixed ones do; and, therefore, by so placing the two layers of segments, that the three moveable ones in the upper layer shall correspond with the three fixed ones in the lower layer, an expanding piston is produced, every part of which that touches the cylinder is a segment of a circle of the same magnitude as the cylinder itself, and while it prevents the escape of steam, has no sensible wearing on the sides of the cylinder.

"Messrs. Helford and Thomas, engine makers, in whose employ Mr. Mottershead is, have made trial of one of his expanding pistons for the last seven months; the inside of the cylinder was found, at the end of that time, not to be in the least degree scored or marked, but retained its polish perfectly. It works without oil, and has been proved by a water pressure of 700lbs. on the inch. The composition of which the piston is made is bronze, consisting of seven parts copper and one part tin. Three other engines have more recently been fitted up by the same makers with Mr. Mottershead's expanding piston."

The circumference of this piston, as exhibited in the elevation fig. 1, plate 4, is divided into six sliding segments, three of them, *h h*, forming an upper layer, and three *f f f*, a lower layer, which alternately overlap and underlap each other. Fig. 2 shews a plan of the lower half of the piston, *f f f* being the segments which slide between the fixed wedges *m m m*; these wedges are fixed to the bottom plate; at *k k k* are pin bolts which enter slot-mortices in the bottom plate, and limit the range of the sliding segments, and prevent them from falling out of their places when the piston is put together; *g g g* are the springs which abut against the fixed central projection, and thence by their elasticity protrude the segments against the cylinder, as the former or latter wear away by friction. The

piston is bound together on the piston rod *c*, by the nut *e*, and the shoulder *d*."

If, instead of copying the erroneous or interested remarks of others, the writer of the preceding paper had examined a little into the truth of them, he would have acted wiser, and more to the credit of the respectable and patriotic Society on whose behalf he wrote them. Alluding to Barton's piston, the writer echoes, that "the *point* of the wedge has been found very liable to mark, and finally to *score and destroy* the cylinder, against the sides of which it is continually pressing *with a force greater than that exerted by the segments.*" In the first place, we would observe, in reply to this uncalled-for attack, that the wedges are *not pointed*, the sharp extremities being taken off in all the pistons that are manufactured. With respect to the statement of their scoring and destroying the cylinder, we have already shewn, in a previous notice of this admirable invention (see vol. 3, new series), that they have no such tendency, and that all the persons making such observations in print have committed themselves in the grossest inconsistencies; we shall therefore merely state in this place, that the objection (if it be good for any thing) which has been urged against Barton's piston by the Editor of the Society's work, applies to Mottershead's piston (as we have before observed) in a greater degree.

The reason given for this effect of "scoring and destroying," is, the inequality of the pressure of the component parts of the piston against the circumference of the cylinder. Now, it would naturally have been supposed, by reasonable people, that the "Society for the *Encouragement* of the Arts, &c." would not have rewarded as an improvement upon Barton's, a contrivance in which the very inequality of pressure spoken of is still greater; but a glance at the drawing of Mottershead's piston will convince every observer, that where the segments overlap each other, there is exactly twice as much pressure against the cylinder as where they lie singly; consequently, the effect will be to wear the cylinder into *alternate grooves and ledges.* Mottershead makes *no* provision against this effect; * no notice whatever is taken of its existence; the Society are blind to the fact; their optics, however, become magnifying lenses in the examination of Barton's, but, like some unskilful microscopists, with high magnifying powers, they mistake the dust that has been artfully thrown into their eyes for real objects. This is the most favourable view we can take of their mistatement of facts; but to Mr. Barton, the consequence is of serious moment. That worthy and ingenious man has struggled through numerous difficulties in bringing various mechanical improvements to perfection; in his patent piston, he has experienced a host of opposition, and, we have heard, that some parties, while condemning his invention, were at the same time pirating and using it privately. To avoid paying Barton a reasonable compensation for

* Barton, in his pistons, makes due provision against the effect of any essential inequality of pressure, by making variations in the metals, or by cutting away certain parts of the rubbing surface of the wedges, to equalize the pressure throughout.

his patent-right, many attempts have been made to modify the invention in such a manner as to evade his claim; but not one of them have succeeded; and after repeated failure, these very persons have been compelled to avail themselves of his skilful assistance. In defence of his patent-right he has also been drawn into expensive law-suits: and whilst forwarding, during twelve years, this valuable improvement in the steam engine, (which ought, by this time, to have yielded him an ample fortune) he has experienced little else but vexation and trouble; but just now, when the proprietors of steam engines are generally becoming sensible of the value of the piston, which has made its own way "through evil report, and good report," and there is a probability of the inventor being *ultimately* recompensed, the "Society for the *encouragement* of the Arts, Manufactures and Commerce" make use of their influence to destroy its reputation, and recommend to the public instead, a slight modification of the Cartwright piston, the principle of which is condemned by all the best mechanics of the present day.

Since writing the foregoing, we have spoken to Mr. Thomas, (of the late firm of Helford and Thomas, alluded to by the Society) who informs us, that further experience of Mottershead's piston has proved to him that they do *not* answer, and that Barton's is the *best* metallic piston hitherto made.

STEAM COACH.

TO THE EDITOR.

Sir,—I presume, from the great public attention excited by Mr. Gurney's steam carriage, that a short account of the means by which the whole is propelled, may prove interesting to your readers. I confess, that, previous to the opportunity afforded me by the liberality of the patentees at their late visit to Bath, that I contemplated all attempts to substitute mechanical powers for living action as impracticable, unless the resisting medium is in an uniform measured degree, as in rail roads, &c. It appeared to me, that the constant changes arising from the inequalities of roads, and those ascents and descents which are in the line of communication between Bath and London, could never be counteracted by that perpetual alteration in the force of steam, as such conditions would require. The horse in an instant accommodates his force to the degree of resistance to which he is exposed; the construction of an inanimate machine, competent to produce corresponding effects, appeared to me to be attended with insuperable difficulties. Mr. Gurney's journey to Bath, and his return to London, have induced me to believe that the principal point is attained; and I think the patentees have judiciously concluded to confine its operation to short stages from London, and which will afford them opportunities of rendering it more perfect before any extensive line of road is proceeded on.—The merit of every machine principally depends on its simplicity. In this respect Mr. Gurney's plan is entitled to every admiration. The power he generates is very little reduced by friction, and its whole force is nearly employed, as the propelling agent. The boiler, or generator,

as it is termed, consists of about twenty gun-barrels, three feet in length, communicating at each end with an iron tube, by which arrangement a general communication is effected with every tube, and the barrels are about one inch from each other, and serve as a grating for the fire above, which is fed with coke from the inside of the carriage; a second fire is placed under the barrels, and supplied from the outside; so that this chain of tubes is placed between two fires; these tubes are completely filled with water, so that whatever degree of heat is employed, the water retains its fluid form, and does not assume a vaporific character before its liberation from the heated barrels; if any additional portion of water be determined into these barrels with a force capable of overcoming the resistance of the valve, then a corresponding portion of water passes into an iron cylinder, about seven or eight inches wide, and two feet long, and immediately flashes into steam; this part of the machine is called the separatory, and answers an important purpose in regulating the force of steam; suppose ten drops of water be converted into steam, at a temperature of 212 degrees, that steam, subsequently exposed to any higher degree of temperature, will not have its powers of pressure increased without an additional dose of water—the separatory supplies the deficiency; so, on the contrary, if the fire be not sufficiently active, the steam contains a surplus of water, and which excess is deposited in the separatory, and prevents the working cylinders from being overcharged with that fluid; from the separatory the steam is alternately determined into two cylinders, which are six inches in diameter, and a stroke of 20 inches; the rods of the pistons are attached to cranks on the axle of the hind wheels, these cranks are reverse to each other, and hence by the reciprocating action of the pistons, a complete revolution of the axis takes place; at each end of the axis is a bar of iron the width of the wheel, and secured at each end by bolts to the circumference; by this adjustment the powers of the pistons are advantageously applied to the circumference of the wheel, and prevents the strain which would be the result, if nearer the nave. As the pistons are elevated by the steam, two pumps are worked by rods going through stuffed boxes, and are attached to the piston at the other end; these pumps communicate with the cistern of water, a small portion of which is determined into the generator, to produce the effect already noticed; the stream is afterwards directed into a cooling cylinder, through a worm, part of which is condensed, and returned to the cistern, and the other portion passes immediately through the chimney into the atmosphere.

The average pressure is about eighty pounds to the square inch of the surface of the piston: it is ascertained that double the pressure does not require the same proportionate increase of fuel; and as economy in this respect is of great importance, the steam in the first instance possesses a power equal to one hundred and sixty pounds, and the communication with the separatory is cut off when the piston has moved through half its range, the expansion of the steam is competent to effect the passage of the pistons through the remaining part of the barrel.

Close by the engineer is a governor, by which he is enabled to

regulate the steam, either by increasing its force or diminishing its quantity; and this important part of the operation is managed with great facility.

From the coke being employed, and the steam considerably cooled, there is no perceptible smoke, nor clouds of vapour, and the cylinders working about thirty times a minute, the same number of revolutions of the hind wheels take place, supposing the circumference to be fifteen feet, the velocity would be nearly six miles per hour; on level ground, it will move through three times this space, so that there would be ninety strokes per minute; under such circumstances, the steam has a less pressing power, from the water not remaining so long in the regenerator. The metal which is employed is forged iron; if from any circumstance the pressure of the steam should overcome the resistance of the metal, no explosive effects would be the result, and no dangerous consequences would follow; the iron would rend, and the steam would escape through this small separation, and the action of the machine is necessarily stopped, and it is only by such a cessation that a solution of the continuity in any part of the apparatus is suspended.

One bushel of coke will suffice for two miles, and one gallon of water is consumed each minute: hence every eight or ten miles a fresh supply of water is required, and every twenty or thirty miles, coke.

From a comparative statement of the relative expences, if we estimate the apparatus and wear equal to four horses, the engineer and stoker as corresponding to the coachman and guard, then the expences will be reduced to the small compass of travelling. I understand that four horses are estimated at 2s. per mile; while the coke required would not exceed 3d. so that the difference of expences would be as 3d. to 2s.

Probably a more important result would arise whenever the time shall arrive for the general employment of this mode of travelling: upon a moderate computation, in the British dominions, a million of horses are appropriated to this purpose, as each horse consumes that produce from land equal to the support of seven men, a change of agriculture would be the result, and food for seven millions of inhabitants thus created, From such a reflection, I am induced to conclude with the noble Duke at the head of our Government, that the advantages are probably incalculable.

No. 11, *Sydney Place, Bath.* C. H. Wilkinson.

NEW FURNACE BOILER.

BY THE EDITOR.

In fig. 4, plate 4, is represented a vertical section of a steam engine boiler, and smoke consuming furnace, which the Editor designed some years ago, and had almost forgotten, until lately, when he stumbled upon the sketch, from which the figure herein given is copied. As, upon consideration, it appeared likely to furnish some useful hints in constructing such apparatus, as well as in the formation of distillatory apparatus, the Editor has not thought it amiss to lay the idea before the public.

a a is the fire, circular in its horizontal section, with conical sides, like the interior of a lime kiln; *b*, a descending flue to the chimney; *c c* the boiler; the lower part, where the lines are drawn, is for the water, the upper, where the paper is blank, is the steam room, the steam being kept to its temperature by the heated chamber *d*; *e* is a steam pipe, near to which may be placed one or more safety valves; at *f f* are apertures for air to blow in to effect the combustion of the smoke; *g g* is the ash-pit, also circular, the grate being of course of that figure; *h h* being formed of non-conducting materials to prevent the radiation of heat. The tube *b* will be red hot, and consume the smoke; the fuel will be economized, as but little heat is wasted. The arrangement is calculated for a low pressure boiler or a still.

IMPROVED STAMPS FOR BOOKBINDERS.

This is an exceedingly simple and excellent contrivance for facilitating the process of embossing the covers of bound books, for which the inventor, Mr. Alexander Bain, of No. 7, Broad Court, Long Acre, was awarded the Silver Isis Medal, and five pounds from the Society of Arts.

The ornamental figures indented on the covers of elegantly bound books, and produced by engraved brass stamps, which are applied to the surface of the cover, and then subjected to strong pressure. The corner pattern is usually triangular, and the middle one is formed by the combination of four impressions similar to the corner one. A single pattern-block is used for this purpose; and therefore in a book, ornamented as above stated, requires to be applied eight different times for each side, or sixteen times in the whole. This occasions the loss of much time; and in order to save the greater part of it, Mr. Bain employs four triangular blocks, capable of being fixed in a simple adjustable frame, so as to suit any sized book. One adjustment with two actions of the press gives the four corners on both sides, and another adjustment with two actions of the press gives the middle ornament on both sides. By this contrivance not only time is saved, but the patterns are capable of registering more accurately than they usually do.

Reference to Engraving, Plate III.

The frame *a a*, fig. 2, is made to hold the rods *b b* parallel to each other, and allow them to be adjusted to any required distance apart; *c c c c* the stamps which are perforated to slide on the rods *b b*, quite even with each other: they are fixed at the proper distance on the rods by small screws at their back, which bind against the rods. The frame *a a* has two long perforations, shewn in fig. 2, to receive the rods *b b*, which have square shoulders and fins to traverse along, and are bound fast by the screwed nuts *d d*; fig. 4 shews one of the rods, with its nuts separate. The small nut *e* screws on after the stamps to keep them from accident by falling off before they are adjusted. It is evident, that by sliding the stamps *c* along the rods *b*, and these rods along the frame *a*, they may be adjusted to suit any size and form of book; and the stamps so held

together, quite even and straight, may be laid truer and quicker on the books when the corners are done. If the same stamps are to be used for the centre, they may be transposed on the rods, and adjusted to suit the centre, as shewn at *f f*; but it will save time, and do the work truer, to have four rods, *b b* and *f f*, to hold the corner and centre stamps at the same time; for, then one putting in the press does one side of a book, and all be exactly alike, without the care of a workman. If the frame *a a* is made a little wider than the thickness of the stamp on the pattern side, it might be adjusted to touch the front edge of the book, which would keep the patterns quite straight and equidistant on all the books.

LIST OF NEW PATENTS SEALED.

SHIPS' WINDLASSES.—To George Straker, of South Shields, Durham, for an improvement in ships' windlasses.—Dated 25th July. Specification to be enrolled in Two months.

IMPROVED VEHICLE.—To Louis Quetin, of Great Winchester Street, London, for a new or improved vehicle, for the carriage of passengers or goods.—25th July. Six months.

TILES.—To Francis H. N. Drake, Esq. of Colyton House, Devon, for improvements in tiles for houses and other buildings.—25th July. Six months.

LEVER.—To John Nicholls, of Pershall, Stafford, for improvements in the lever, and the application of its power.—25th July. Two months.

STEAM BOILERS.—To Joshua Bates, of Bishopsgate Street, London, for improved method of constructing steam boilers.—1st August. Six months.

WHITENING SUGARS.—To Joshua Bates, of Bishopsgate Street Within, London, for a new process of whitening sugars.—1st Aug. Six months.

SPINNING.—To John Hutchinson, of Liverpool, for improvements in machinery for spinning cotton, &c.—30th July. Six months.

BANKERS' CHECKS, &c —To Nathaniel Jocelyn, of Newhaven, State Connecticut, North America, for improvements in the manufacture of blank forms for bankers' checks, &c. to prevent forgery.—3rd August. Four months.

LACE.—To Thomas Bailey, of Leicester, for improvements in machinery for making lace.—5th August. Six months.

COACHES.—To Thomas Brown, of Birmingham, for an improved coach. —5th August. Six months.

DISTILLATION.—To William Shand, of the Burn in Kincardineshire, for improvements in distillation.—10th August. Six months.

BARILLA.—To John Mac Leod, Esq. of Westminster, for improvements in preparing barilla.—10th August. Two months.

STREET WAYS, &c.—To James Rowland, and Charles Mac Millan, of Heneage Street, Brook Lane, Spitalfields, Middlesex, for an improved process of constructing street ways, &c.—11th August. Six months.

PIANO-FORTE.—To Thomas H. Rolfe, of Cheapside, London, for improvements upon the self acting piano-forte.—11th August. Six months.

RAISING FLUIDS.—To Edward Weeks, of King's Road, Chelsea, for improvements in raising fluids to various distances.—14th August. Six months.

HEAT.—To Henry C. Price, and Charles F. Price, of Bristol, for an improvement in apparatus for communicating heat.—20th August. Six months.

MEDICINE.—To John Mushet, of York Square, Regent's Park, Middlesex, for a certain medicine for gouty affections of the stomach, spasms, &c.—20th August. Two months.

WOOLLEN CLOTHS.—To John Jones, of Leeds, for improvements in machinery for dressing woollen cloths.—21st August. Six months.

ANCHORS.—To William Roger, of Norfolk Street, Strand, London, for improvements in the construction of anchors.—21st August. Six months.

DESCRIPTIVE ACCOUNT OF ALL THE

PATENTS ENROLLED BETWEEN 20TH AUGUST AND 20TH SEPTEMBER, 1829.

Particularizing the Offices in which the Specifications may be inspected; with the Dates of Enrolment.

MATERIALS FOR SCOURING, MILLING, AND FULLING CLOTH.—To William Storey, of Morley, in the parish of Botley, in the county of York, plumber and glazier, and Samuel Hirst, of the same place, clothier, a patent "for certain materials, which, when combined, are suited to be employed in scouring, milling, or fulling, cleansing and washing cloths, and other fabrics, and, by the employment of such material, considerable improvements in those processes are effected," was granted on the 10th of March, and the specification was enrolled in the Enrolment Office on the 10th of September last.

The substance which these patentees propose to employ in the above-mentioned processes, is a liquid, which they prepare by keeping 400 gallons of human urine in a close cask, or other vessel, for six weeks, and then distilling it in a common still-worm, after adding one pound of tallow, made from beef suet, to prevent the liquid from frothing during the process of distillation. To the liquid ammonia obtained by this process is to be added the best mottled soap, in the proportion of one pound of soap to every hundred weight of the liquid ammonia, and, after these have been thoroughly united, by repeated agitations, the saponaceous mixture is to be preserved for use in casks, or other vessels, closed, so as to prevent the contact of atmospheric air.

FABRIC BOOTS AND SHOES.—To Richard Hall, of Plymouth, tailor and woollen-draper, a patent "for a composition applicable to certain fabrics or substances, from which may be manufactured boots, shoes, and various other articles," was granted on the 10th of March, and the specification was deposited in the Enrolment Office on the 9th of September.

The object of Mr. Hall's invention is to give to strong linen cloth or other suitable fibrous substances a glossy appearance, resembling dressed leather, and, at the same time, the property of being impervious to wet or moisture.

The preparation of the composition is first described, and then the method of applying it to the fabrics intended to be manufactured into boots or shoes. The composition consists of one pound of bees' wax, eight ounces of Indian rubber or gum, four ounces

of resin, eight ounces of ivory-black, and four ounces of lamp-black, melted together by the application of a continued slow heat, or by boiling, and brought to a consistence which can be applied to the fabric with a brush, similar to that used in applying varnishes to different substances; the fabric is then stretched on the flat top of a vessel, and heated by water, in order to preserve an uniform temperature while the composition is being spread upon it. After the first coat of the composition has been dried by exposure in the open air, a second coat is to be applied in a similar manner, and for some purposes a coat of caoutchouc varnish is to be applied in the inside of the fabric, to render it perfectly impervious to moisture.

Although the patentee describes the above-mentioned processes of making and applying a composition for rendering fabrics fit for the manufacture of boots or shoes, he does not confine himself either to the substance named or to the quantities employed; but he claims the exclusive right of making and applying a composition similar in its properties to the one described to the above-named purpose.

An establishment has been opened in the Strand, by Messrs. Hall and Co., for the manufacture of boots and shoes of this patent material, which they denominate *pannus corium, or leather cloth*: and they state that their boots and shoes will last longer than those made of curried substances, and that they are adapted to all climates, and have no tendency to crack. From the trial which we have seen made, it appears that they are more easy for corny feet than common shoes; but, on showing a pair to our friend, who mends shoes, he said, when they begin to wear out, they cannot be repaired, and that there is nothing like leather.

FIRE-PROOF CEILINGS AND PARTITIONS.—To William North, of Guildford Place, Kennington, Surrey, surveyor, a patent for "an improved method of constructing and forming ceilings and partitions for dwelling-houses, warehouses, workshops, or other buildings, in order to render the same more secure against fire," was granted on the 4th of July, and the specification was deposited in the Enrolment Office on the 3d of September 1829.

Instead of lath and plaster, Mr. North proposes to make ceilings of, and to cover partitions, with fire-proof tiles composed of ground Bath stone, quick Dorking lime, and plaster of Paris, in the proportion of four parts of the Bath stone to three of the plaster of Paris, and two of the quick lime: or, according to the directions

in the specification, take any quantity of powdered Bath stone, and add to it half the quantity of powdered unslacked Dorking lime, and to the mixture add half its quantity of plaster of Paris. When these have been thoroughly mixed up with water till the mass becomes of the consistence of mortar, the composition is to be placed on a flat table provided with moveable frames to form it into tiles of uniform dimensions, with their alternate edges beveled off, as represented by figures 2 and 3, plate VI. that the one may in some measure lap over and support the other, when they are placed on the ceiling joists, or on the frame work of the partitions. When the composition has set, or become sufficiently firm to be removed from the frames, which, as well as the surface of the table, must be first lubricated with some oily substance, to prevent the composition from sticking to them, are to be detached, and the tiles, being then loosened from the table by knocking upon it with a hammer, are taken away and placed on their edges, to dry and become hard enough for use.

Into each tile is placed, while the composition is in a soft state, two iron staples to receive hooks, by which they are to be attached to the joists. One of the staples, with the hook by which it is nailed to the joist, is represented by fig. 4. The lower part of the staples are brought within a quarter of an inch of the face of the tile; but they must be carefully prevented from projecting through to destroy the uniformity of the face. The method of fastening them up is also shown at figures 2 and 3. And it will be observed, that the edges are joined in a sloping direction, so that the one supports the other, rendering staples and hooks necessary only on one edge of each, and at the same time preventing the passage of flame between them. Every alternate row upon the ceiling or partition, is begun with a half tile, so that the transverse joinings may not coincide with each other, or that they may, what is technically called, break joint.

Mr. North does not claim, in his specification the exclusive right to manufacture such a composition as he has described, being aware that such compositions have been previously used for building purposes; but he claims the invention of such ceilings and covering for partitions as he has described; and we have very little doubt but that the introduction of this invention will be found, in many instances, very advantageous.

Printing Machinery.—To James Wills Wayte, late of Drury Lane, but now of Gough Street, Mount Pleasant, Middle-

sex, printer, a patent for "certain improvements in printing machinery," was granted on the 19th March, and the specification was enrolled in the Rolls Chapel Office, on the 15th September, 1829.

This specification describes three improvements in printing machinery; the first consists of a printing machine, or press, having two tables with a form on each, the one to press the first side of the sheet, and the other to perfect it, or print the second side. These two tables are placed on a vibrating frame, which is actuated by a crank, and brings them alternately under a pendant-platten, which is brought down upon them through the instrumentality of a crank, to give the impression. The frame which supports the form-tables, consists of a parallelogram jointed at the angles; and therefore the horizontal position of the forms is preserved, both when they are elevated to the platten to receive the impression, and depressed to the rollers to receive a supply of ink. There is an inking apparatus for each form, placed at opposite ends of the machine. It consists of a long trough and a ducter and supply-roller, of the usual description; with distributing-rollers which traverse the forms, and are kept in their places by guides, with long vertical slits to receive their axes. When either of the forms is depressed, its distributing rollers are carried to the ink-trough to receive ink from the supply-roller, which they transfer to the form by passing over its surface as it is elevated.

The paper to be printed is supplied to the machine from a feeding-board, through the medium of an endless web passing over rollers, connected by bands, or chains to the main shaft which communicates, simultaneously, to all parts of the machine. The sheets of paper being placed on the feeding board, a boy pushes them forward singly, when they are successively caught by the rollers and endless web, by being pressed down upon them through the medium of a projecting lever, operated upon at stated times by the motion of the machinery. When the sheet of paper is brought between the form and the platten, its motion, as well as the motion of the form, is stopped while the impression is communicated to it. This stoppage of motion is effected without interfering with the motion of the main shaft and other parts of the machinery, by removing the teeth from a portion of the circumference of the spur-wheel which communicates motion to the web rollers. After the first impression has been given to the sheet, it is carried about another roller, which turns its reverse side towards the platten, while the second or perfecting form is brought, by a

vibration of the frame-work, under the paper to print the second side, or to give it the perfecting impression, which is effected while the motion of the web roller is stopped as before.

The platten is suspended over the centre of the press, and guided perpendicularly down by strong frame-work, and the pressure is produced by a vertical rod, connected with the platten at its upper end, and with a revolving crank at its lower end; a lever, with a counterpoise, is also connected with the lower end of the vertical rod, which compensates for the weight of the rod and platten, while the two form tables balance each other on the vibrating frame; and thus jarring irregularities in the motion of the machinery is prevented.

The second improvement consists of a printing press, or machine, with but one form table, which is placed upon a frame, and made to vibrate between two plattens, placed in oblique positions, where impressions are given by each with such rapidity, that two or more feeding boards, with the requisite web rollers, are required to supply it with paper. This is a single printing machine; and there the sheet has to pass through it twice before the printing is completed. It differs, however, materially from the common printing machines, it having two plattens and a form table placed between them on a vibrating frame, instead of running forwards and backwards on wheels, as is the case with the printing machines employed at the Times Office, and other machines made by Applegarth and Cowper.

Mr. Wayte's third improvement consists in a new arrangement of inking rollers, by which he is enabled to diminish their number, and to effect a saving in the ink, by conducting the supply to such places only of the distributing rollers as come in contact with the types. This is effected by causing the inking rollers to pass over distributing blocks, which are made to correspond with the types in the form, and supplied with ink by a transferring roller; and by this means the ink is supplied only to such parts of the rollers as come in contact with the types. This inking apparatus is equally applicable to the printing machines invented by Mr. Wayte, and to those of the usual construction.

Windlasses.—To George Straker, of South Shields, in the county of Durham, ship-builder, for "an improvement in ships' windlasses," a patent was granted on the 25th of July last, and the specification was deposited in the Enrolment Office on the 15th of September.

The object of this patent is to save the time employed by the men working a windlass, in raising the handspikes from one slot in the windlass to another, and also to give additional power to the machine. The latter, the patentee effects by fixing on the barrel of the windlass, near one end, *a*, a spur wheel, which is acted upon by a pinion, *b*, whose axis extends across the vessel, and moves in the same bearings which support the windlass itself, as represented by fig. 5. plate VI. Upon each end of the pinion axis are fixed two circular pieces, *c c*, like two crown ratchet wheels, with only four teeth in each, placed face to face, with the teeth directly opposite, and approaching each other within about an inch. These pieces are represented in perspective, at *c c*, also by a separate, fig. 6, and by a plan, fig. 7. The handspikes, which are worked between these pieces, are forked at one end, to take in the axis of the pinion, as represented by fig. 7. The forked end of the handspike is made of iron, and sufficiently thin to pass up between the projecting teeth of the above-named circular pieces, when withdrawn a few inches, and by this means it can be raised with facility; and when it is pushed in, its shoulders, *d d*, rest on the projecting teeth, which enables the men to turn the pinion, and through that medium the windlass acts with great power. It will be perceived, that, by this arrangement, instead of having, as usual, to withdraw the handspikes, and insert them in a new hole every time they are brought down to the deck, they have only to be withdrawn till their shoulders can pass outside of the projecting teeth, moved past a second pair of teeth, and then returned again till the shoulders rest firmly upon them.

This is evidently a very convenient and excellent method of of working a windlass, and might be applied, as stated by the patentee, to windlasses without the intervention of the spur-wheel and pinion.

Barilla.—To John Mac Leod, of Westminster, surgeon on the Madras establishment, for "improvements for preparing, or manufacturing certain substances so as to produce barilla," a patent was granted on the 10th August last, and the specification was deposited in the Enrolment Office on the 21st of the same month.

Barilla is an impure soda, usually obtained by burning to ashes different plants which grow upon the sea-shore. It is chiefly imported from Spain and the Levant: an inferior kind is made in

this country, by burning sea-weed, and designated British barilla, or kelp. Mr. Mac Leod proposes to obtain this article, which is extensively employed in the manufacture of glass and soap, from the impure carbonate of soda which is found in abundance on the Coromandel coast, and known by the name of *natron*. After the moisture of a rainy season has disappeared, the surface of the earth is observed to be covered with this native carbonate of soda, which gives it a singularly efflorescent appearance. It is gathered in considerable quantities by the inhabitants, and may be obtained at an expense little exceeding that of procuring ballast for trading vessels, laden with light goods, or returning without cargoes.

The natron collected in this way is mixed with considerable quantities of clay, sand, and earth; and to separate the soda from these and other impurities, Mr. Mac Leod claims the exclusive right. He seems, however, to confine his right to the natron found in India; perhaps he is not aware that it is found much more abundantly in the lakes near Alexandria, and on the coasts of the Black and Caspian seas. He states, that a considerable time ago he conceived that a very useful barilla might be obtained from the Indian natron; and that he accordingly set about clearing it from its impurities by washing, evaporating to dryness, and submitting it to a strong heat in a reverbratory furnace, to drive off the carbonic acid. On the first trial, he found, however, that the silicious matter had not been entirely removed, as the substance was converted by the heat of the furnace into glass. He therefore repeated the process of washing, &c. with greater care than he had formerly employed, and at last succeeded in obtaining from the natron of the Coromandel coast, a barilla which was sold in the London markets at a higher price than the Spanish barilla.

It does not appear from the specification, that Mr. Mac Leod has discovered any new process of purifying the native carbonate of soda; but still he deserves much commendation for having obtained from a new source, an article of very extensive use in the manufactures of this country; and, the patent which he has taken out may be of service to him, and it cannot possibly do injury to any other person.

PATENT SAFETY LAMP—by Thomas Bonner, Esq. of Monkwearmouth, Durham; enrolled June, 1828. Having given at page 18, the safety lamp by Mr. Dillon, we have thought it desirable to introduce a description of Mr. Bonner's improvements,

in order that our readers may be acquainted with all the improvements made in this important invention of the late truly illustrious Sir Humphry Davy. The improvements proposed by Mr. Bonner in the construction of safety lamps, consist in a means of increasing the light, and of instantly extinguishing it, at pleasure. Fig. 1, plate VI. represents a vertical section of the lamp; figures 2 and 3, are plans of the top of the lamp, shewing two covers of a peculiar form for extinguishing the light: in plan 2, the covers are exhibited open; and in plan 3, shut. Fig. 4, a plan of the extinguisher; the corresponding letters in each figure have reference to similar parts.

The mode of increasing the light of the lamp is as follows; instead of introducing a wick in the centre of the lamp, as is usually at present practised, he introduces a series of small wicks round a centre tube, as shewn at *a*, fig. 1 and 2, and by lighting one, two, or more wicks at a time, little or much light is obtained. These wicks are placed in small tubes, fixed in a metal ring, whose inner diameter is rather larger than the outer diameter of the fixed open tube in the centre of the lamp, and the outer diameter of the ring is rather less than the diameter of the opening for the light on the top of the lamp; so that this ring with the wick-tubes fixed in it, slips easily in, and goes round the centre tube, the inner edge of the ring resting upon a narrow ledge left on the centre tube to support it, as at *b* fig. 1; or the outer edge of it rests on a ledge left round the opening for the light, as shewn at *c*; and as the ring is thereby at perfect liberty to revolve, the wicks are carried round by the trimming iron. The ring may either be level with the top of the lamp, or a little below it; but those parts of the wick tubes having the slits for the trimming, must be above the ring, and a slit made on each side of them, but not opposite each other in the same tube.

There are two methods described for extinguishing the light; the first is as follows; *d d*, fig. 1, gives an edge view "of two covers of a peculiar form for extinguishing the flame while unscrewing the gauze top, which is enlarged, or spread out in diameter at bottom, as shewn at *ff*, fig. 1, to allow room for these covers to act. The plans of these covers are exhibited in figures 2 and 3, and the light is by their means prevented from being improperly exposed. These covers are formed of two pieces of thin metal, placed upon the upper side of the lamp, upon studs or otherwise, so as to traverse and pivot on the pin or screw *o*, fig. 1, and *o o*, fig. 2 and 3; the covers may be carried over the light

so as to extinguish it, by any mechanical means; but that adopted by the patentee, is to place two or three catches on the screw-ring, as shewn at *e*, fig. 2 and 3."

The other method of putting out the light is, by an extinguisher shewn at *g*, fig. 1, of which a plan is given by the separate fig. 4; this is "suspended at the top of the gauze cylinder by a combustible substance, such as a piece or slip of wood, or paper, so that the extinguisher shall fall upon the light, when the combustible substance is either burnt or broken, by pressing upon the driver *i*. This extinguisher is formed of a thick circular piece of metal, of the same diameter as the interior of the gauze cylinder, or nearly so. It is made with two grooves to slide on two wires, *h h*, to guide it on its ascent and descent, which wires are secured at the upper end to the brass top, *p*, of the cylinder, and at the lower end to two of the outer wires. This extinguisher may also be suspended by a pin, *k*, to be inserted at *l* or *m*, or other convenient means. A piece of wire, *n*, is used as a trimming wire."

BRITISH CASHMEER SHAWLS.

Several unsuccessful attempts have been made to introduce and to naturalize, in the British islands, the shawl goat of Cashmere, that variety of the common goat, or perhaps a peculiar species, the down of which is the material of the so called India shawls.

These fabrics, in fineness of fibre, lightness, and warmth, are unrivalled by those of any other material. It has therefore been considered, both in France and England, a very desirable object to introduce the shawl goat, for the purpose of ascertaining whether the climate of Europe is suitable to it, and whether, under these circumstances, the fine down given it by Nature, as a protection against the winter cold of its own country, will be produced unimpaired in the fineness of its staple.

A few years ago some shawl-goats were introduced into Scotland, but the experiment did not succeed, as they died without leaving any progeny.

From France two agents were sent to Persia, under the patronage and protection of the Emperor Napoleon, for the purpose of making purchases of goats of the Cashmeer breed, in the province of Caspahan. A considerable number of these animals was procured; and, although many of them died in their long march to the coast of the Euxine, and in their passage thence by sea to Perpignan, yet a certain number survived, and were brought to Paris by M. Terneau, in the year 1823.

Mr. Tower, happening at that time to be in Paris, purchased four of them, two males and two females, and succeeded in conveying them safely to his residence in Essex.

The soil of the park at Weald Hall, where they have been kept ever since, is moist, and the situation is much exposed. The animals have, nevertheless, continued in health, and have multiplied rapidly; so that his present flock consists of twenty-seven, including the four original ones. Of these latter, a polled female, which was old when purchased by him, has every year produced at least one kid, and has twice had twins. Those individuals, of which the horns cross, are, in Persia, esteemed the best; and one of Mr. Tower's last-year kids has this peculiarity. They show no impatience of cold, and are very healthy, requiring only the occasional shelter of a shed in very rough weather. In spring, summer, and autumn, they graze like sheep, and, during winter, have been fed with hay, and refuse vegetables from the garden; but their favourite food is the gorse (Ulex Europacus), which they devour eagerly, without being annoyed by its prickles. They damage young plantations, but not more than other goats or deer will do. They breed very early; three of Mr. Tower's goats, this year, produced kids before they were themselves a twelvemonth old.

A few produce brown down; but that of by far the greater proportion of the goats is white; and this latter is more valuable than the other.

The coat is a mixture of long coarse hair and of fine short down: this latter begins to loose early in April, and is collected easily and expeditiously by combing the animals two or three times with such a comb as is used for dressing horses' manes. A good deal of the long hair comes off at the same time, but the manufacturer has found no difficulty in separating it.* The produce of a male is about four ounces, and of a female about two ounces. Two pounds of down, as it comes off the goat's back, may be estimated to make one shawl fifty-four inches square; it will therefore require ten goats, male and female, to furnish materials for one shawl.

Mr. Tower has this year had three shawls made of his down, one of which was examined by the committee of manufactures. The yarn was spun by Messrs. Pease, of Darlington, and was woven by Messrs. Miller and Sons of Paisley. Mr. Tower's shawl was compared with one made in Scotland of French shawl-goat wool, to which it was evidently far superior; it was also compared with a French shawl of M. Tenneau's own make, and was considered by very competent judges to be superior to this also.

* A considerable quantity of rough cashmeer wool was imported from India a few years ago, and baffled the attempts of the manufacturers to disentangle the down from the hair; probably in consequence of the down having become felted in conveying it from Cashmeer and shipping it from Calcutta.

ECONOMICAL METHOD OF TRANSMITTING MOTION.

Invented by Mr. John M'Dowall, Vauxhall.

Motion is often required to be communicated to machinery at a distance from the first mover, and this is usually effected by a metallic shaft, which, if the distance between the machinery and the first mover be great, must be made of considerable thickness, to prevent its being twisted to pieces by the power applied, or else by chains, straps, or ropes, which, to prevent their slipping on the drums or pulleys over which they pass, causes considerable impediment to the motion by friction. These are inconveniencies which cannot in all cases be avoided; but, under some circumstances, the following method of transmitting motion, through the medium of three rods and two triple cranks, connecting the machinery with the first mover, might be introduced with considerable advantage.

The apparatus is represented with the axes of motion placed horizontally by figure 1; and with the axes placed vertically by figure 2. The same letters represent similar parts in both figures. It will be perceived that the motion may be in the direction shewn by the arrows, or the contrary; and hence the motion may be reversed at pleasure.

Fig. 1.

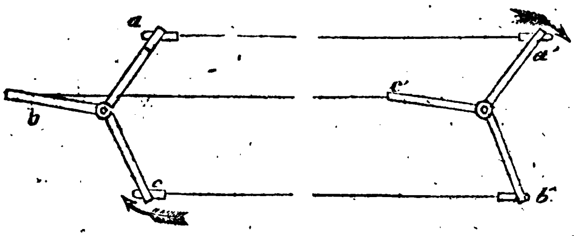
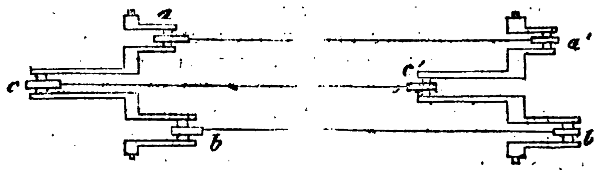


Fig. 2.



The triple crank *a b c*, to be put in rotation by any first mover is connected by three rods to a similar crank *a' b' c'* of equal dimensions; and as the cranks project from the axes at equal distances there will always be one of them in a position to produce a pulling action, and hence there will be no necessity for having the conducting rods stronger than what may be sufficient to sus-

tain by tension the resistance of the machine to be put in motion, and thus the expence of transmitting motion, by this method, to a considerable distance will be very small. The motion, too, will be perfectly uniform, for, as the leverage of the crank *a*, for instance, diminishes by its rotation, that of the corresponding crank *a'* will be equally diminished; so that whatever motion is produced by the first mover will be faithfully transferred to the machinery.

IMPROVED METALLIC SHUTTERS.

TO THE EDITOR.

Sir,—Every man of experience is aware it *sometimes* happens, in mechanical invention, that different individuals in endeavouring to obtain the same result, contrive, independently of each other, similar means of effecting it; but it is of *very rare* occurrence that the arrangements of the parts are, in both cases, exactly the same in all respects: happily, it is *still more rare*, that a man after being shown an invention, after having seen it publicly used in various places, should take out a patent for it for that purpose, making a solemn oath that the invention is a *secret*, is perfectly *new*, and was *never before practised* in this country. Incredible as this may appear, I trust to your candour and sense of justice to allow me to prove, that this has been done to my prejudice by Mr. Andrew Smith, the ostensible patentee, in the patent described in your last number as "granted to Mr. William Henry Kitchen, of High Street, Bloomsbury, and Mr. Andrew Smith, of York Street, Westminster, for improvements in window-shutters and doors." This patent is dated Feb. 7, 1829, and the specification was lodged in August, 1829.

Now, it was well known to Mr. Smith, that I put up publicly at Mr. Boston's, the ironmonger, in Hackney, this identical invention in the month of *Sept.* 1828. At that period I was the foreman to Mr. Thomas Don, the engineer, and having previously directed my attention to the improvement of his metallic shutters, I succeeded in perfecting those novel arrangements which Mr. Smith has *since* patented in conjunction with Mr. Kitchen.

These improvements having been shown to Messrs. Hankey, the bankers, in Fenchurch Street, they so much approved of them, that they gave directions for the metallic shutters, they had had previously of Mr. Don (constructed upon quite another principle), to be taken down from the front of their banking-house, and others on my principle to be substituted for them. This order was executed by Mr. Don, in Nov. 1828, under my directions and superintendance, and so entirely to their satisfaction, that they have recently given an order for the fitting up of another part of their premises in precisely the same manner.

Were it necessary, it would be an easy matter for me to prove, by a hundred circumstances, that Mr. Smith was acquainted with all that was done by Mr. Don and myself in the manufacture of these shutters; but I shall content myself with stating one or two other incontrovertible facts, which alike prove that the invention originated with myself, and that Mr. Smith knew of it.

In the month of December 1828, I superintended the fitting-up of the shop of Mr. Westwood, in Princes Street, Haymarket, with my metallic shutters; but, owing to a trifling imperfection in the work, an unpleasant noise was made in drawing up the shutters about a week afterwards. At this time, Mr. Smith, who was previously acquainted with Mr. Westwood, called to look at the new shutters, when Mr. Westwood requested him to examine the movement, with the view of ascertaining the cause of the noise; *he did so examine it*, and the inconvenience was removed.

About this period Mr. Don experienced some severe misfortunes (owing to his confiding and generous disposition), which led to the public sale of his stock and manufacturing implements. At this sale Mr. Smith was present, and actually purchased several models, and the whole of the drawings, of the metallic shutters, for the sum of nine shillings!

Thus equipped with all the materials for a patent, Mr. Smith becomes a patentee, and repeats, in his specification, the solemn declaration that the invention was perfectly new, and was "never before practised in these kingdoms."

As the facts I have stated are incontrovertible (and such as any body may satisfy themselves of, by reference to the parties mentioned), I shall not adduce any others, but proceed to shew the identity between my invention and that which Mr. Smith has since patented, which I cannot do better than by copying your concise and clear explanation of the patent given in your last Number, inserting only a few letters of reference, which exhibits, in the clearest light, that there is no variation whatever in the arrangements.

The accompanying drawing (plate V.) represents an elevation of the front of Messrs. Hankey's Banking-House (correct to scale, as respects the shutters, and the windows to which they were applied). The window, as will be observed, is divided into two equal portions; that on the right-hand side of the leader is represented as being closed up by the metallic shutters, and that on the left is represented as having certain portions of the wooden casings broken away, to exhibit the movement, to explain which, I shall, as before said, use *your words descriptive of Smith's* patent.

"*These improvements in shutters consist in alterations of the arrangements and operations of the apparatus connected with the patent metallic shutters described at length in the second volume of the new series of the* REGISTER OF ARTS. *Instead of the shutters being raised or lowered by cords or chains passing over pullies, as there described, the present patentees* PROPOSE *to employ screws extending from top to bot-*

tom, on each side of the window;" (as shewn at letters *a a*, in my drawing,) "*a simultaneous motion is effected in the screws, by means of a bar extending across the bottom of the window,*" (see letters *b b*) "*and connecting by bevil wheels,*" (see letter *c*,) "*both screws with a winch handle,* (*d*) *by which they are turned. Upon the screws are fitted, nuts,* (*e*) "*to which are attached the shutters,*" (*f f f*, which hook into each other,) "*and, therefore, by the operation of turning the handle, the shutters are steadily and silently raised in front of the window, or lowered into their case.*"—Here ends the description as applicable to my improvements; but you further observe, in continuation, that "the patentees *mention* some variations in the construction of this apparatus, *such as endless chains passing over spiked wheels,* instead of the screws for raising the shutters, or instead of the bars and wheels for transmitting the motion from one side of the window to the other." Now, in this last-mentioned plan, Mr. Smith is equally, or more, in fault than in the other; for he knows well, that it was tried at Messrs. Hankey's, and failed; and in consequence of such failure, was taken down, and the screw machinery, introduced by me, substituted in its place.

The operation of the present apparatus having given unqualified approbation, Messrs. Hankey are now employing Mr. Thomas Thomas to fit up the remainder of the front of their premises in Fenchurch Street in a similar manner. The shutters for this purpose, are completed ready to put up, and may be seen in the manufactory of Mr. Thomas, (in Holland Street, Blackfriars,) to whom I have communicated fully my methods of constructing and manufacturing; and I have no hesitation in assuring the public, that there is at present no other person so competent, in every respect, to execute work of this kind.

Your obedient Servant,

John Mac Dowall.

Observations by the Editor.—We have made a call at Mr. Thomas's manufactory, and examined the metallic shutters constructed for Messrs. Hankey, in which we cannot discover the slightest difference from those which we saw described in Messrs. Kitchen and Smith's specification. The security afforded by this admirable invention is such, as to entitle it to adoption wherever property is liable to the depredations of the burglar. Its operation is steady and uniform; and from its great simplicity and strength, it is almost impossible to be put out of order. The shutters being attached to the vertical screws by large nuts, it is evidently impossible to force them up or down, with any power that could be applied by burglars; while, by the application of a little winch inside the premises the operation of raising or lowering the shutters may be easily performed by a child. The great durability of these shutters renders them much more economical than those of wood, notwithstanding the first cost of the latter is somewhat less.

EXPERIMENTS WITH STEAM-BOAT PADDLES.

BY THE EDITOR.

NOTWITHSTANDING the very numerous plans that have been proposed to improve the propelling apparatus for steam-boats, by substituting other machinery for the ordinary paddle-wheel, we do not hear of any of them being adopted. That a great loss of power is sustained, owing to the paddles entering and leaving the water at an unfavourable angle, when they are placed in the position of radii to the circle cannot be disputed, though its amount is variously estimated, and in reality they do very considerably under different circumstances; for, if the diameter of the wheel be very large, and the depth of immersion very little, the disadvantages mentioned are so trifling as to render the adoption of an apparatus that is more complex, less strong than the common wheel, by no means eligible.

With the view of ascertaining whether the common wheel could not be improved, without materially altering the simplicity of its structure, we instituted some experiments a few days ago, which, we are happy to say, were attended with results so satisfactory, that we propose to renew and extend them, with apparatus on a larger scale. That which was employed in the experiments we are now about to describe, consisted of a kind of double boat, formed out of two solid pieces of wood, each about 30 inches long; they were shaped at the head and stern like a common coal barge, and were secured together, by nailing across the ends, on their superfices, two slips of wood, which kept them about 8 inches apart; into the recess thus formed between these two representatives of boats, were placed successively the models of five differently formed wheels, (shewn at plate VI. by figures 9 to 13.) They were made of tinned iron plate, and all of the same dimensions, namely, 7 inches diameter, 3½ inches wide, and the paddles 1 inch deep. A tube was formed through the centre, for a moveable axis, which was, therefore, made common to them all; the ends of the axis turning in plummer blocks fixed to the inner sides of each boat. The power was applied by means of two weights descending from two pullies fixed in a frame above, the lines of which were wound round the axis of the paddles on each side, to keep the apparatus equipoised; a strong thread was attached midway between the sterns of the two boats, and the other end was wound upon a little reel. The trial was made upon a large basin of still water, on a calm day.

The wheel, No. 9, in which the paddles are bent into right angles, and *the sides inclosed* being put on the axis, the weights wound up, and every thing carefully arranged to prevent, if possible, the error of a second of time, notice was given to let go; the weights, then descending, propelled the machine by the revolution of the wheel, which drew out 28 feet of thread in 37 se-

conds of time, before the weights had reached the lowest point of descent: this, it should be observed, was the *mean* result of *three* experiments, differing only in a very slight degree; which was a velocity equal to 45 *feet per minute.*

Upon substituting the wheel No. 10, which has paddles of the same shape, but with the sides left open, as in the ordinary wheels, the average of three experiments gave 25 feet, 4 inches of space, travelled over in 36 seconds, which is equal to a speed *of* 42 *feet per minute.*

In the wheel, No. 11, which has been applied to several steam-boats, there is no other difference from the common wheel, except that the paddles, instead of being placed in the position of radii, are fixed at the angles shewn in the figure. The mean result of three experiments with this wheel, gave a speed of 45 *feet per minute.*

The wheel No. 12 is the common wheel, without spokes, or radiating bars; the paddles being soldered to the tin plate; three experiments were made with this wheel, with scarcely any variation, in the results, the mean of which was *sixty-eight feet and a quarter per minute.*

The wheel No. 13 is the common wheel, left open, as usual, which averaged, upon three trials, a speed equal to 47¼ *feet per minute.*

We were prepared to expect an advantage from enclosing the common wheel in the manner described; but the extraordinary increase of one-third in the effect never entered into our imagination. The result being of the highest importance to steam navigation, we have great pleasure in thus making it known to the public.

It will be observed, that, in all the experiments, the quantity of power and of resistance were uniform, and therefore that no very important error could have been made. Had we not made the experiments ourselves, we should have been very slow to believe, that, by this very simple and inexpensive alteration of the paddle-wheels, a boat, that is now propelled by her engines at the rate of 8 *miles* per hour, may make nearly *twelve* miles per hour!

Test for Cotton in Cloth.—At a late sitting of the Royal Academy of Metz, the following method of detecting the presence of cotton in woollen stuffs was communicated. An ounce of pure alkali is dissolved in half a pound of water, and in this the suspected stuff is boiled for two hours. If the stuff is of pure wool, it dissolves entirely, and forms upon the surface a soap, which will pass through a fine sieve; but if, on the contrary, the stuff contains cotton, or any other vegetable fibre, it will not be entirely dissolved, but will show itself when thrown into the sieve.

GURNEY'S STEAM CARRIAGE.

The misrepresentations that have been put forth to the public, through the medium of the newspapers, relative to Mr. Gurney's steam coach, induced the Editor of this Work, a few days ago, to send a copy of the annexed Letter

TO THE EDITOR OF THE TIMES.

Sir—As a constant reader of your invaluable Paper, I could not have failed noticing from time to time, a succession of accounts relative to the experiments made with *Gurney's* steam carriage, as it is called, for if the accounts alluded to be true, it might as well have been called *your's*, Mr. Editor, or *mine*, and as I shall presently show, that it is any-body's and every-body's.

Having been for many years the editor of a periodical work on mechanical science (the Journal of Patent Inventions), it may be presumed that I possess *some* knowledge of what has been done in matters of the kind; and this knowledge, however limited, has caused me to regard with surprise, and even wonder, the impositions that have been practised upon the public credulity, relative to the steam carriage in question, by writers who betray an entire ignorance of the progress of improvements made in the steam engine, and of the various inventions of those ingenious men of the present day, who have given their attention to the construction of locomotive carriages.

I am, Mr. Editor, an ardent admirer, an absolute lover, heart and soul, of every thing connected with machinery, but above all with that noblest piece of mechanism, the steam-engine; and it is with delight that I anticipate the period when steam shall supply the place of horses, not only in propelling our carriages on the common road, but in drawing the plough and the harrow over the fields of the husbandman. If therefore I find fault with those writers who have heaped upon Mr. Gurney honours which do not belong to him, or who have ascribed inventions and discoveries to him, which were bequeathed to us by our fathers, or are the produce of living genius, let me not be suspected of a desire to damp the ardour of discovery, or to throw the slightest obstacle in the way of improvement. I am most ready to acknowledge that much credit is due to Mr. Gurney; he has persevered for nearly three years in making numerous experiments in locomotion, at an enormous expenditure of money; and now if the testimonies of his friends (Mr. Herapath, Dr. Wilkinson, and others, who have deluged the diurnal press with their communications), are to be relied on, it would appear by them that Mr. Gurney had abandoned all his own contrivances, and adopted those of others instead; receiving from his friends the most fulsome adulation for so doing, as if the inventions were original and extraordinary. It is likewise but fair to acknowledge that Mr. Gurney has done more in

public with steam carriages than any of his contemporaries, which I consider to be owing to his contemporaries not wishing to exhibit in public until they can do something better than Mr. Gurney has hitherto done; for I am not disposed to judge very favourably of his experiments, when I perceive that all the accounts hitherto communicated to the newspapers have contained great misrepresentations of the facts, or they have suppressed some of those necessary data by which alone a correct judgment can be formed. These remarks particularly apply to the last statement that appeared in the Times, of the 8th instant, being a communication from Mr. John Herapath, of Cranford, which I am desirous of replying to, rather than such an incorrect statement should remain unanswered.

That I may waste no more of your valuable space than is necessary to the exposure of the fallacy of Mr. Herapath's statements, and the defence of those numerous ingenious men whose inventions he has ascribed to Mr. Gurney, I shall pass over the prefatory observations and proceed to the examination of the "*happy series of inventions*," by which he asserts "*Mr. Gurney has obviated all the obstacles opposed to the success and safety of his carriage.*" Now had Mr. Herapath not attempted to prove this assertion, he would not have exposed Mr. Gurney and himself to the ridicule of every mechanic and engineer in the kingdom; for it unfortunately happens, as I will take upon myself to shew most clearly, that *not a single invention out of the whole* of the "happy series," described by Mr. Herapath, had Mr. Gurney any more to do with the conception of, than Mr. Herapath had with the building of the temple of Solomon, notwithstanding he appears so desirous of passing for one of that great man's disciples, by his repeatedly reminding the reader of his "mathematical investigations," and his "scientific researches." Well may Mr. Gurney exclaim, "save me from my friends, I will take care of my enemies."

Having stated that the great practical discoveries of Mr. Gurney had completely "confirmed his" (Mr. Herapath's) "scientific researches," he proceeds "to kill two birds with one stone," by telling us what the "series of happy inventions" consist of, and this explanation shews us at the same time, what was the *nature* of his "scientific researches;" for it must be quite evident to every informed person, that Mr. Herapath's researches in mechanism, have not been extended beyond the limits of Mr. Gurney's carriage. In that carriage he saw the inventions of Watt, and Hornblower, and Woolfe, and Trevethick, and Brunton, and Perkins, and Griffith, and James, and Hill, and Gordon, but knew them not;—all was new to him;—all extraordinary and peculiar, to "*to this celebrated invention:*" yet the fact is demonstrable, that were the inventions of these men taken away, there would be nothing else left in the carriage, if Mr. Herapath's detail of them includes every thing; and I have no hesitation in saying, that nothing more, worthy of particular notice, was wanting to complete such a steam carriage as Mr. Gurney's is represented to be. Perhaps Mr. Herapath has been writing ironically

against Mr. Gurney's machine, for the effect of such praise on the minds of well-informed persons, is to depreciate its value and interest. The present carriage, Mr. Herapath says "differs from the earlier carriage, in several improvements in the machinery, suggested by experiment; also in having no propellers; and in having only four wheels instead of six; the apparatus for guiding being applied immediately to the two fore-wheels, bearing a part of the weight,i nstead of to two extra leading wheels bearing little or none."

The reason for not using the propellers may be, that he is not permitted to use them, by a previous patentee, Mr. Gordon, who in 1824 patented a very similar contrivance, which was an improvement upon the original invention of 1813, by Brunton. It is a circumstance worthy of remark, that in the prospectus issued by Mr. Gurney, of his first steam carriage, between two and three years ago, he asserts that the propelling by means of levers, acting against the ground in the manner of horses legs and feet, was the only efficient mode, as the following extract from that document will shew.

"The great difficulties appear to have arisen, first from the unmanageable weight of the steam engine and apparatus, and secondly from the imperfect or *wrong* application of the power; for, with a few exceptions, they have *invariably applied the power to the wheels*, forgetting that these being passive, are unequal in resistance to propel any weight against inclined planes over bad or uneven roads. These difficulties, whether arising from weight, or application of the power, appear from *experiment* to be completely removed, for instead of the power being, as hitherto, applied to the wheels, propellers or feet are made to connect the engine with the ground, in such manner that the engine propels itself and the carriage with great rapidity."

Now, however, Mr. Gurney finding from further experiment, that all his contemporaries were right, and that he only was "*wrong*," he abandons the propellers, applies his power to the "passive" wheels, and then Mr. Herapath's "researches" leads him to proclaim it as one of Mr. Gurney's happy inventions!

With respect to the employment of four wheels instead of six, every body knows this is only copying the plans of others, and in the application of the guiding apparatus to the foremost of these, "bearing a part of the weight" the "improvement" is equally original; for let it be remembered that Mr. Gurney was the only locomotionist that ever committed that ridiculous error of applying the guiding apparatus to any other; and in thus abandoning that silly contrivance of the "*pilot wheels*," (which was the name given to it, and was the theme of much foolish admiration); and in adopting in lieu the plans of his contemporaries, Mr. Herapath considers Mr. Gurney to have added another to the "series of his happy inventions. I pass on to the next. "No person can conceive," says Mr. Herapath, in an ecstacy, "the absolute control this apparatus gives to the director of the carriage, unless he has had the same opportunities of observing it which I had in a ride with Mr. Gurney. Whilst the wheels obey the slightest motion of the hand, a trifling pressure of the foot keeps them inflexibly steady, however rough the ground."

This steering apparatus, (as illustrated in the recently published drawing of Mr. Gurney's carriage) was previously adopted by Burstall and Hill, Gordon, Anderson and James, Hague, and various others; but it was found to have great defects; and those of the above-mentioned gentlemen who are proceeding with their carriages, have, I believe, abandoned it, and are substituting more efficacious contrivances. The defects consisted, in having so limited a range as to render it impracticable to make very sharp turnings, and in being so deficient in power, as to require the arm of a Hercules to turn it at all, when upon rough ground. (It is true, that Mr. Gurney's has a very long lever, which reduces the range in the ratio that it increases its power.) When Mr. Gurney finds out these disadvantages, and, abandoning the contrivance, shall take up the improvements mentioned above, I doubt not Mr. Herapath will seize hold of them, in like manner, to swell the "series of happy inventions." With respect to keeping the fore-wheels steady by pressure with the foot, Burstall and Hill did this, in the same manner, by forcing two friction plates into contact. The next *improvement* is thus described.—

"To the hind axle, which is very strong, and bent into two cranks of 9 inches radius, at right angles to each other, is applied the propelling power by means of pistons from two horizontal cylinders. By this *contrivance*, and a peculiar mode of admitting the steam to the cylinders, Mr. Gurney has very ingeniously avoided that cumbersome appendage to steam-engines, the fly-wheel, and preserves uniformity of action by constantly having one cylinder on full pressure, whilst the other is on the reduced expansive."

It does not appear that the "scientific researches" of the writer had enabled him to discover that, "this contrivance," has been in common use above thirty years. Trevithick and Vivian had a patent Engine in 1802, in which cranks at right angles were employed; but the crank was thus applied much earlier than that period, probably nearly as far back as the first invention of the crank in 1736, by Jonathan Hulls; at all events, it has been used in almost every steam-boat since his time, and is now universally applied in steam navigation, and very extensively for other purposes; but especially in almost every steam-carriage prior to Mr. Gurney's. Then, as to the results of this brilliant discovery, by which Mr. Gurney "has very ingeniously avoided that *cumbersome appendage* to steam engines, the fly-wheel, there cannot be a doubt in the mind of any mechanic, that Mr. Gurney would rejoice exceedingly if he could find convenient means of applying it. Mr. Herapath would thus make it appear, that Mr. Gurney was like the fox in the fable, who, when he could not with all his cunning, find means to get at the clusters of delicious grapes that hung over him in the vineyard, shook his head at them, swore they were sour, and would have nothing to do with them.

With regard to the mode of working by expansion, the "scientific researches of Mr. Herapath ought to have informed him, that this was invented by Watt, in 1769, that Woolfe patented his improvements in 1804, and that subsequent engineers had much sim-

plified, and, I might almost say, had perfected the principle. The mode, as described by Mr. Herapath, is indeed so common, that I make no doubt a thousand engines are at the present moment being worked by it; and it has besides been used in all steam-carriages prior to Mr. Gurney's. In explaining the advantages attending this pretended novel mode of Mr. Gurney's, the writer has only incorrectly repeated what is explained much better in every work or tract on the subject, that has been published during the last 20 years. So much for this "improvement." Now for the next:—

"Firmly fixed to the extremities of the axle, and at right angles to it, are the two "carriers"—(two strong irons extending each way to the felloes of the wheels). These irons may be bolted to the felloes of the wheels or not, or to the felloes of one wheel only. Thus the power applied to the axle is carried at once to the parts of the wheels of least stress—the circumferences."

I am most ready to admit, Mr. Editor, that so bungling a contrivance as this was never before applied to a *steam*-carriage, though I remember having seen it applied to a dung-cart by an old farmer, who nailed a board across the dislocated wheel, to keep it together in its journey to the wheelwright's. Would Mr. Herapath have us suppose, that Mr. Gurney is incapable of making a proper wheel, one in which the periphery, or felloes, shall be as firmly united to the centre, or nave, as if it were a solid body? I have a greater respect for the talents of Mr. Gurney, than to suppose it possible; but admitting his incapacity to do this, as Mr. Herapath insinuates, is there not Theodore Jones's patent suspension wheel, which answers all these conditions, combined with lightness and elegance? If Mr. Herapath should still insist, that these clumsy iron bars, so funnily surnamed "carriers," shall be inrolled among the "happy series," I dare say the old farmer above-mentioned will very good-naturedly allow him all the honour and profit arising therefrom.

"By this artifice," Mr. Herapath continues, "the wheels are required to be of no greater strength and weight than ordinary carriage wheels." I would here enquire whether it is not very strange to object to a wheel, on account of superior strength; unnecessary weight is certainly objectionable, and, by putting heavy iron bars across a bad wheel, one would imagine that Mr. Gurney was rather seeking for weight than strength.

Mr. Herapath next tells us, that these wheels "turn freely and independently on their axles; but one, or both of them may be secured as part and parcel of the axle, as circumstances require." Messrs. Burstall and Hill patented this contrivance in 1825; their specification describes two excellent methods of effecting it, and the object is stated to be, "the causing the wheels to be impelled, when the axle revolves, and at the same time allowing the outer wheel, when the carriage describes a curve, to travel faster than the inner one, and still be ready to receive the impulse of the engine, as soon as it comes to a straight course."

The next mentioned *invention* of the "happy' series,' is thus described:—

"Beneath the hind part drop two irons with flat feet, called, 'shoe-drags.' A well-contrived apparatus, with a spindle passing up through a hollow cylinder, to which the guiding handle is affixed, enables the director to force one or both drags tight on the road, so as to retard the progress in a descent, or, if he please, to raise the wheels off the ground."

A contrivance closely resembling this, has been for several years in use in the Diligences of France; the same thing was adopted, or was proposed to be adopted, in Mr. Gordon's locomotive carriage, and was actually applied and patented by Viney and Pocock, in their Kite Carriage, or Charvolant. Contrivances for the same purpose have been adopted in all the steam-carriages; but those I have particularised, have so close a resemblance to Mr. Gurney's apparatus, that Mr. Herapath may fairly class it among the "happy series." The utility of this apparatus is, however, so truly extraordinary, that I trust your readers will excuse my repeating Mr. Herapath's observation; he says—

"The propulsive power of the wheels being by this means destroyed, the carriage is arrested in a yard or two, though going at the rate of 18 or 20 miles an hour."

I cannot, Mr. Editor, boast of my "scientific researches," or "mathematical investigations," like Mr. Herapath, but if he can stop without destruction, a ponderous body like a steam-carriage, so suddenly, whilst moving with the velocity of 20 miles an hour, I must regard him as a much greater man than my old acquaintance Gulliver, who, when the artillery of a fortress was opened upon him, faced the terrific shower of cannon balls, caught them in his hands, and flinging them back again, destroyed the fortifications and his enemies together!

"On the right-hand of the director lies the handle of the throttle-valve, by which he has the power of increasing or diminishing the supply of steam *ad libitum*, and hence of retarding or accelerating the carriage's velocity."

Now, this has been applied in all other steam-carriages in a similar way, and is the well-known common appendage to all stationary engines for the same puspose.

The next observation is—

"The whole carriage and machinery weigh about 16 cwt. and with the full complement of water and coke, 20 or 22 cwt. of which, I am informed, about 16 cwt. lie on the hind wheels."

If this statement be correct, Dr. Wilkinson's must be otherwise; and from the candour of the latter gentleman, and his abstaining from praising his friend for what did not belong to him, I certainly rely most upon his statement. Dr. Wilkinson tells us, that there are two cylinders, each of 6 inches diameter, and having a stroke of 20 inches. Now, I confidently appeal to any engineer, whether it be possible to construct cylinders of the *magnitude mentioned*, with boiler sufficient to generate the steam required to work them, the framings and the casings, the pumps, condensers, flues, chimney, and all the *et cetera* of the engines, the guiding and friction apparatus, the drags,

the "carriers," the four wheels, body, frame, perch, &c. at less than 30 cwt. (and I should not be surprised to learn that the actual weight was above two tons). There is then the coals and water to add, for which Mr. Herapath adds from only 4 to 6 cwt. Of the correctness of this, we shall be able to judge by comparing it with the data furnished by Dr. Wilkinson, who says that,

"One bushel of coke will suffice for 2 miles, and 1 gallon of water is consumed each minute; hence, every 8 or 10 miles, a fresh supply of water is required, and every 20 or 30 miles, coke." According to the most favourable statements of Mr. Gurney's journey from Melksham, ten miles were performed in about an hour and a half, or 90 minutes; and as a gallon of water, which weighs 10 lbs. exactly, is required for each minute, here are 900 lbs. of water, besides the weight of the tanks, which must be 100 more. Then if we take the coke for 30 miles, that is 15 bushels, which, at 45 lbs. per bushel, is 675 lbs. therefore without calculating the weight of the receptacle for coke, we have, in fact, a greater weight for the fuel and water alone, than Mr. Herapath tells us is "the whole weight of the carriage and machinery." The vast difference between these statements shews how little may be relied upon them; and it is deserving of notice, that none of the writers who have communicated to the public papers, have told us the important fact, that *the supplies of coke and water were carried by another carriage, drawn by horses*, on the journey from Melksham.

To follow Mr. Herapath through his argument on the capabilities of this machine, arising out of calculations made from erroneous data, is a task to which neither the patience of your readers or my time will permit. I therefore propose to notice briefly only two more of the "happy series" (which Mr. Herapath recapitulates towards the close of his letter, and dwells upon with poetic fervor, lest his readers should forget them) and then conclude my epistle.

One of these relates to the apparatus for reversing the motion of the engines, and thereby causing the carriage to go backwards, which is uniformly applied to steam-boats, for reversing the paddle wheels, and has been applied in every steam carriage constructed prior to Mr. Gurney's. The next and the last remarks I shall make relates to his boiler, or steam generating apparatus, which Mr. Herapath does not condescend to acquaint us with the structure of; but, on reference to Dr. Wilkinson's letter, we find the following description.

"The boiler, or generator, as it is termed, consists of about twenty gun-barrels, three feet in length, communicating at each end with an iron tube, by which arrangement a general communication is effected with every tube, and the barrels are about an inch from each other, and serve as a grating for the fire above, which is fed with coke from the inside of the carriage; a second fire is placed under the barrels, and supplied from the outside; so that this chain of tubes is placed between two fires; these tubes are completely filled with water, so that whatever degree of heat is employed, the water retains its fluid form, and does not assume a vaporific character before its liberation from the heated barrels; if any additional portion

of water should be determined into these barrels, with a force capable of overcoming the resistance of the valve, then a corresponding portion of water passes into an iron cylinder, about *seven or eight inches wide*, and two feet long, and immediately flashes into steam; this part of the machine is called the seperatory."

All your scientific readers will immediately perceive that this last (and by far the most important to a steam carriage) of the "happy series," is the invention of the ingenious Mr. Perkins, with the alteration only of Mr. Perkins's term of "*safety chamber*," into that of "*seperatory*." The name of *safety* chamber excited so much risibility among the friends of Mr. Perkins, who properly considered it the *danger* chamber, that Mr. Perkins has lately ceased calling it by that name. With regard to this brilliant and original discovery, Mr. Herapath says, "The dreadful consequences of boiler bursting are annihilated by a judicious application of tubular boilers. Should, indeed, a tube burst, a hiss about equal to that of a hot nail plunged in water contains the sum total of alarm, which a few strokes of a hammer will set all to rights again."

While I agree with Mr. Herapath, that no danger is to be apprehended from the small tubes, or gun-barrels, I do hope that he will take my advice, and in future keep at a respectful distance from the "seperatory," alias "safety chamber," alias "danger chamber." The first name is perhaps as good as any, as it is calculated to caus a final separation of the constituent parts of the bodies of those persons who should have the temerity to trust to the safety valves, notwithstanding Mr. Herapath assures them that these valves afford the "ultimatum of security."

Accidental circumstances may, and do sometimes, cause the bursting of boilers, however strong in their structure, and however ingeniously guarded by safety valves. All sensible men have in consequence considered it as a desideratum in mechanics to construct a boiler, so that, if it does burst, no harm shall result. The effect of the sudden liberation of steam and hot water will be in proportion to their quantity; therefore, when boilers are formed entirely of small tubes, safety valves are comparatively unnecessary, (although they are very useful in measuring and regulating the force of the steam), because no harm can result from the opening or bursting of a tube. Although great difficulties have been found in adapting tubular boilers to the regular supply and working of an engine, all scientific men are agreed upon their perfect security. The public have been led to consider this fact as an axiom in mechanics; taking, therefore, advantage of this circumstance, Mr. Herapath tells the public, that Mr. Gurney's boiler being constructed by a judicious application of tubes, "*the dreadful consequences of boiler bursting are annihilated.*" Now, is this assertion true, or is it false? The public are *deeply* interested in the decision of this question. Why has Mr. Herapath omitted to describe this "judicious application of tubes," which must of course be the happiest of the "happy series?" Is it that he knows the invention to be Mr. Perkins's, placed under circumstances of greatly increased risk? or is it that he wishes to avoid the

naming of the "seperator," and make the public believe that there is no "danger chamber" for the knowledge of which we are indebted to the candour of Dr. Wilkinson. Were there no vessels larger than the gun-barrels mentioned, I should consider the boiler perfectly safe, and should have no objection to have a seat on the top of it in cold weather; but if Mr. Gurney persists in using his "seperatory," which has an area about one hundred times greater, I should prefer a seat, even on thorns, half a mile off; for, to use the words of Mr. Herapath, I should *then* consider "*the danger to be apprehended in going over rough pitching, from too rapid a generation of steam,*" to be really imminent.

Having, I trust, satisfactorily shown, that every one of the "happy series of inventions" mentioned by Mr. Herapath as constituting Mr. Gurney's carriage, were the inventions of other men, and that many of those inventions are not the happiest imaginable, I shall here conclude.

I am, Sir, most respectfully,
Your obedient Servant,
LUKE HEBERT.

No. 20, Paternoster Row, 19th September, 1829.

TRANSACTIONS OF THE SOCIETY OF ARTS, &c.

FOR THE YEAR 1828.

(Continued from page 60.)

FLOATING BRIDGE.—The *large silver medal* was awarded to H.W. Hood, Esq., commander of the Hyperion frigate, for a floating bridge. This ship, during the last three years, has been stationed in the harbour of Newhaven, for a particular service, in which it is very important that ready access should be had at all times from the ship to the shore. But although the vessel is moored within a short distance of the wall of the harbour, the bed of mud is so deep as to be wholly impassable, and the only time that communication could be maintained with the shore was at high water, by means of boats. As the service entrusted to Captain Hood was materially impeded by this obstacle, he set himself to form a bridge by means of the cables, casks, gratings, and other articles, with which every ship of war is necessarily provided, and the result is a secure bridge, easily accessible at any time of the tide, though the difference between high and low water in the harbour of Newhaven is not less than 22 feet. There are many similar situations, both at home and abroad, where it may be expedient to station ships of war, and in all such cases commander Hood's invention will be found of great advantage.

Two lengths of the bower chain-cable were placed parallel to each other over the mud, and at right angles with the ship's length, and her fish davits were sunk in the mud as posts, to set the cables up to; at the extreme ends from the piles, near the ship, a series of

casks were placed upon them, with grummet slings (snaked); two parallel lengths of the stream chain-cable were carried over the casks, and the ship's gratings were then placed on the upper part from cask to cask. As the buoyancy of the casks was still more than sufficient for the weight of the chains and the gratings, besides any reasonable weight that might be required to be transported over them, the whole was made as secure as possible by lashings; and the ship's spare capstan-bars were nailed on to filling pieces, fastened to the headings of each alternate cask, some spare rope being rove through the swifter holes, to act instead of a rail on each side.

At low water, when the tide has forsaken the mud-bank of the river, this bridge affords a dry and sure footing for the people required to pass over it, as the casks then lie in the mud, and form the supporters of the gratings; and when the tide is in, the buoyancy of the casks supports the bridge afloat; thus setting the boats at liberty or any other service that may be required.

To afford a convenient method of descending to this bridge, when the ship was afloat, a stage was run out from the starboard gangway, to which was suspended a long ladder, and, as the ship is moored head and stern, the ladder necessarily rises and falls with her, as the tide is flowing or receding. Weights are suspended from the ship's side, which lead from the upper chains of the bridge through sheave holes, cut in the staunchions of the platform, and thus is produced a constant and tight man-rope. Another ladder, for landing, is placed at the other end, against the embankment.

Cock for Bottling Wine.—The *silver medal* was voted to Mr. J. Castell, of No. 24, Dartmouth Street, Westminster, for what the Society of Arts term "his improved mode of drawing off wine from the cask, in order to bottle it." They observe that "the double cock which he uses for this purpose expedites the business, occasions a less loss of liquor, and, by allowing it to flow continually, instead of with intermission, as is the usual mode, avoid the risk of disturbing it until quite upon the lees."

This "double cock" is in fact a *treble* cock, and though it is a round-about contrivance, it may be said to be a triangular one, too, there being three valves, situated at the extremities, as it were, of the letter T. The consonant T has, however, in one respect, very little consonance with the cock T, the former being very simple, the latter being complicated, and, we ought to say, the most bungling "improvement" we have met with for some time past. We will, however, first endeavour to describe the thing, without the aid of drawings, the labour of which we grudge much, when tending to no useful end.

We have already referred to the figure of the letter T to explain this contrivance; let the upright line of that letter be considered to represent a plan of the common liquor cock, with the revolving plug in the middle, the lowest extremity being that which is inserted into the cask; and the upper end, instead of terminating as they usually

do, with a spout inclining downwards, has a tubular cross piece branching from it, at right angles, in opposite directions (as the top line of the letter T), and at each of the extremities of these pipes is a valve or cock, the levers or handles of which are tubes, through which the wine flows when they are turned downwards, as that action opens the orifices; on turning up these tubular levers, the orifices are closed, or shut off, and the wine ceases to flow. These tubes are inserted into the necks of two bottles whilst filling, and, when one is filled, the bottling man has to draw away the bottle, and, stopping the end of the tube with a finger, he turns up the tube filled with wine, which closes the cock. Having placed an empty bottle in the place of that just filled, he stops the tube again with a finger, and turns it down into the neck of the bottle, and, while this is filling, he performs the same operation as that described with the other bottle, and so continues to attend to each alternately.

By the term "improvement," we are apt to understand something better than has been done before; and will the Society of Arts take upon themselves to say that this is a better plan than Mr. Masterman's, described in the fourth volume, first series of this work. It is impossible but that every man of common sense amongst them must acknowledge that Masterman's is an infinitely superior method; that it is unfailing, exactly uniform in quantity, surpassingly rapid, self-acting, perfectly cleanly, and avoids almost the possibility of waste in filling. Castell's possesses but few of these qualities, and those which it does possess are in a very inferior degree to Masterman's.

If, therefore, the Society continue to give their rewards for such sad retrogressions in art, as the present contrivance, they will soon cease to be regarded as a Society for the *encouragement* of Art. Castell's operation is dirty, slopping, depending upon constant watchful attention, and great dexterity. Masterman's requires nothing whatever of the operator, but to change the bottles, and, if other business prevents him changing them, the operation ceases of itself the instant the bottles are filled, and without ever spilling a drop of wine.

Viewed as a piece of mechanism, Castell's is, as we have said before, complex and round-about. He has three cocks besides a union-joint to connect the cross-piece to the other; when it must be quite plain to every mechanic, who considers the subject, that one simple *two-way* cock will answer the purpose. If cocks must continue to be used for bottling, we have an idea of what appears to us to be an improvement, which we will submit to the reader in the succeeding number.

IMPROVED TURNING-LATHE.—Having had occasion to make some unfavourable strictures upon several of the inventions rewarded by the Society; it is with sincere pleasure that we turn to a subject which appears to us to be deserving of our unqualified admiration, namely,

the improved turning lathe, invented by Mr. Joseph Clement, of 21, Prospect Place, Newington Butts, whom the Society has very properly rewarded with their gold Isis Medal; for a description of the same,

To afford a perfect understanding of this beautiful piece of mechanism, a series of elaborate drawings are necessary, we shall therefore refer the reader, for all the details of the machinery, to the Society's volume, contenting ourselves here with making a few observations on its importance and utility, which we cannot do better, than in the Society's own words.

"A difference exists, though, perhaps, it may be difficult to define the boundaries with much precision, between those engines or machines that are intended to produce manufactured articles in the usual sense of the word, (that is, articles immediately applicable to the supply of human wants) and those of which the produce consists in such parts as enter into the construction of machines of the former class. The loom, the lace-frame, the machine for spinning cotton, the stocking-frame, the corn-mill, are examples of the first kind; the wire drawing-machine, the engine for cutting the teeth of wheels, the turning-lathe, are examples of the second kind. To a person unacquainted with mechanics, the former class are the most interesting: the sight is dazzled by the rapid motion, and the imagination is bewildered by the immense complexity of parts, each performing its office with undeviating regularity, and the understanding is interested by following the successive changes undergone by the raw material in its progress to the complete manufactured fabric. We admire the master mind that has so combined all these movements and processes, as to obtain from their concurrent action, a definite and useful result. If, however, we analyse all this seeming complexity, we shall soon find that it reduces itself to a few movements, to a small variety of parts repeated over and over again, and in which very great precision is far from being requisites to the production of the manufactured article; because the manufactured article itself may vary within certain limits, and continue equally applicable to the use for which it is intended. An inch in length of a piece of a fine muslin, may contain twenty-nine threads, and another inch in the same piece, may contain thirty threads; and the difference shall be quite imperceptible, even to the most practised eye. But no mechanical motion can be produced without the expenditure of power; and of this power, a part only is really employed in effecting the intended object, the remainder being lost and dissipated in consequence of the imperfection of human workmanship. In some machines it has been found, that the power thus lost has amounted to by far the greater part of that originally employed; and as all first movers are costly, whether live power, the expansion of bodies by heat, or the force generated by the impulse of air or water in motion, it has, of late years, been an object of great solicitude to economise as much as possible the power which we have at our disposal. This is effected by increased precision and accuracy of fitting in those parts which, by their motion on one another, transmit the primary impulse to the

place where the force is to be exercised. But it is obvious that, whatever precision the machine possesses, at least an equal degree of accuracy of adjustment must exist in the tool or machine by which it is made. If the cylinder of a steam engine is rejected, which, with a diameter of five feet, varies in any part more than the 80th of an inch, the lathe by which the demanded truth of bore is given to it must be at least equally true. Before the invention of the slide-rest had relieved the workman from the necessity of holding the cutter in his own hands, such precision was quite impossible; but, since that invention, improvements have been continually making on the lathe for turning metal, so as to convert it into the most accurate and most extensively applicable of all tools. Flat surfaces of unrivalled correctness have of late been produced by it; and it is to this employment of it that Mr. Clement's improvement particularly applies.

"It is evident, when the mandril of a lathe, having a metal plate fixed to it, turns round with a uniform motion, and the slide-rest which carries the cutter is moving from the circumference of the work to the centre, that the quantity of metal passing over the edge of the cutter at each revolution, and therefore at equal intervals of time, is continually diminishing, in exact proportion to the diminution of the spiral line described by the cutter on the face of the work. But in turning metal plates, it is exceedingly disadvantageous to increase the speed of the work beyond a certain quantity; for when this happens, the edge of the cutter is broken, and made dull, and the surface of the plate becomes indented and burnished, instead of being turned. The speed, therefore, must not exceed that which is suited to the work at its circumference, although for every other part it is slower than might safely be used in proportion to the approach of such part of the centre. Hence results a loss of time on the part of the workman, and of work done on the part of the instrument, which, considering the capital and skill expended in the construction of a first-rate lathe for turning metal, is a matter of no small importance. Mr. Clement has overcome this almost the only remaining imperfection in the lathe, by making itself regulating; so that, whatever be the situation of the cutter, equal quantities of metal shall pass over it in equal times, at the same time giving the workman the power of converting the varying rate of the mandril into a uniform one whenever he chooses."

Ladder Crane.—The *silver medal* has been voted to Mr. W. Hilton, for his ladder crane. There are many situations, especially in London, where, from want of room, heavy and bulky articles are obliged to be stowed away in cellars or vaults, the access to which is very inconvenient and contracted. The cellar of a warehouse occupied by Mr. Hilton is in this condition, the only entrance to it being by a trap-door and ladder. This ladder he has ingeniously converted into a crane, at comparatively a small expence, and very little increase of bulk, by means of which large articles, may be lowered into, or raised out of a cellar, with little trouble.

The construction of this ladder, will be understood by reference to the diagram, fig. 1, plate VI. *i* is the steps of the ladder, having projecting ridges, or ways on both sides, as shewn by the dotted line *j*; *k* is a platform, on which the goods are placed to traverse, by means of two rollers *m*, (one being on each side of the platform and ladder) which bears against the front of the ladder, and two rollers *n*, which bear against the the back, or underside of the ridges *j*, and hold it like a hook, as they turn in studs fixed to the side bars of the board *k*. These rollers are so adjusted to the slope of the ladder, as to keep the board *k* level, while the weight keeps the rollers always in contact with the planes over which they move. The board *k* hangs on two ropes *p*, which are made fast to its underside, and pass over two wide pulleys *o*, at the top of the ladder, and then descend to the barrel *q*, placed across the ladder back; the barrel is moved by its wheel *r*, and the pinion *s* on the offside of the ladder, the axis of which crosses the ladder, and is turned by the winch-handle *t*, on the nearside. The barrel is provided, as usual, with a ratchet wheel and click, (not represented), and a brake, or friction band, may be applied to the wheel *r*, or to one on the pinion axes.

Machine for the use of Boot and Shoe Makers.—Two *Silver Isis Medals* have been voted, one to Mr. James Dowie, and one to Mr. Alexander Black, for their machine for the use of boot and shoe makers. It is generally known that the bent and constrained sitting posture in which the makers of boots and shoes perform their work, holding the materials on which they are employed between their knees, as in a vice, subjects this class of artisans to chronic diseases, of a very painful and afflicting nature, by which their health is often so seriously impaired as to leave no chance of relief, except in the hard alternative of quitting their occupation; an alternative which, to any man, and especially to those who earn their daily bread by their daily labour, cannot but be productive of great anxiety, and is too often attended with the breaking up of those habits of industry and regularity, on which depend the respectability of the individual, and the welfare of his family. The Society have always shewn themselves very desirous of encouraging inventions that have in view the prevention of these calamities; and have at different times rewarded, and published machines, especially for the use of the very numerous class of workmen who are employed in boot and shoe making. These machines may be seen in the Society's repository, but have only been occasionally adopted; because, though the principles of their construction are good, the details are defective. The machine of Messrs. Dowie and Black, while in principle it is nearly the same with those already invented, has been formed with such a clear professional knowledge of the objects to be aimed at, and of those to be avoided—has been arranged with such excellent contrivance, and with such simplicity of movement, as, apparently, to leave nothing further to be desired. Mr. Dowie, who is a master boot and shoe maker, has introduced the use of the machine among his own work-

men, and it is beginning to be adopted by others of his townsmen in the same line of business. We propose to ourselves to give the drawings and description of this machine, at the earliest opportunity.

CRAMP FOR LAYING FLOORS.—The *Silver Isis Medal* was awarded to Mr. Andrew Smith, for his lever cramp, for bringing the edges of flooring boards in contact, previously to their being nailed down. A description, with an engraving of this excellent instrument is given in our 2d. vol. page 225.

SURGICAL INSTRUMENTS.—The *large Gold Medal* was awarded to J.P. Holmes, Esq. for his improvements in obstetrical instruments; and the *Silver Isis Medal* to Mr. J. Gibson, for a spoon for administring medicine to children and lunatics, described by us in our last volume.

SHEET CORK.—The *Silver Isis Medal* has been voted to Mr. R. Lloyd, for his samples of sheet cork. The principle use to which sheet cork has hitherto been applied is, as a material for socks, or internal sole shoes, in order to protect the feet from damp. But from the mode by which thin plates of cork have hitherto been formed, the texture is more or less shattered, and therefore the utility of it much restricted. Mr. Lloyd has very successfully adapted the engine used for splitting skins, to cutting places or sheets of cork. The texture of the material is thus preserved unshaken, and he is enabled to produce sheets not more than a 32d. of an inch thick. The inventor himself has applied sheet cork to form the frame-work to hats; and there is no doubt that many other uses will soon be discovered for it.

SUGAR CANE INSECTS.—The *Gold Ceres Medal* was awarded to the Rev. Landsdown Guilding, of the Island of St. Vincent, for a communication respecting the insects that infest the sugar cane, in the West Indies, and the means which should be adopted for expelling them.

NEW CANADIAN PIGMENTS.—The *Gold Isis Medal* was awarded to Wm. Green, Esq. of Quebec, secretary to the Literary and Philosophical Society, at that place, for a description, accompanied by samples, of several substances, both mineral and vegetable, the produce of Canada, from which valuable paints for the use of artists may be prepared. The samples, on their arrival, were put into the hands of artists, members of the Society, who have reported very favourably respecting them. We propose to give the communication of Mr. Green in our next number.

South-Wales Wine.—The *Gold Ceres Medal* was awarded to Gregory Blaxland, Esq. of Sydney, New South Wales, for a sample of wine, the produce of his own vineyard in that colony. Five years ago, the *large Silver Medal* was conferred on this gentleman, for a sample of wine from the same vineyard. The vines with which it is stocked, are derived from a small black cluster grape, supposed to be a seedling from one of the claret grapes, originally introduced by Mr. Blaxland. Being a native of that colony, it endures the climate far better than any of the imported vines. The wine sent this year is decidedly better than that for which the former reward of the Society was granted. It cannot be expected, that the produce of such young vines should have much flavour; but as the stocks get older, and less succulent, the quality of their juice will, no doubt, improve. At present, it is praise enough, that the wine is sound, and perfectly free from that flavour which characterises, not advantageously, the wines of the Cape of Good Hope.

LIST OF NEW PATENTS SEALED.

LOCKS.—To G. H. Manton, of Dover Street, Piccadilly, for an improvement in the construction of locks for fire-arms.—Dated 2nd September. Specification to be enrolled in Two months.

CANNON.—To J. Tucker, of Hammersmith, for certain improvements in the construction of cannon.—9th September. Six months.

MACHINERY.—To T. S. Brandreth, of Liverpool, for a new method or methods of applying animal power to machinery.—9th September. Six months

FIRE-PLACES.—To J. A. Fonzi, Esq., of Upper Marylebone Street, for certain improvements on, or additions to, fire-places.—9th September. Six months.

LIGHT.—To J. Soames, Junr. of Wheeler Street, Spitalfields, for a new preparation or manufacture of a certain material produced from a vegetable substance, and the application thereof to the purposes of supplying light.—9th September. Six months.

IRON PLATE.—To T. Morgan, of Tipton, for a new method of manufacturing or preparing iron plate.—9th September. Six months.

POWER AND MOTION.—To R. Torrens, of Croydon, for certain apparatus for the purpose of communicating power and motion.—9th September. Six months.

FIRE-ARMS.—To D. Lawrence, of Strood, and J. Crundwell, of Ashford, for certain improvements in apparatus to be applied to fowling-pieces and other fire-arms.—15th September. Six months.

ROPES, CORDAGE, &c.—To G. Harris, R. N. of Bromptom Crescent, Middlesex, for improvements in the manufacture of ropes, cordage, canvas, &c.—15th September. Six months.

DRESSING STONES.—To John Milne, Edinburgh, for a machine or engine for dressing of stones.—15th September. Six months.

CANE JUICE.—To James Atchison, Clyde Buildings, Glasgow, for certain improvements in the concentrating and evaporating of cane juice, &c.—15th September. Six months.

PAPER.—To Thomas Cobb, Esq. Calthorpe House, Oxford, for certain improvements in the manufacture of paper for the hanging rooms, &c.—15th September. Six months.

TIME-KEEPERS.—To T. Westwood, of Princes Street, Leicester Square, for certain improvements in watches and time-keepers.—23d September. Six months.

WATCHES.—To I. Brown, of Gloucester Street, Clerkenwell, for certain improvements applicable to watches.—23d September. Two months.

WATER CLOSETS.—To H. Tyler, of Warwick Lane. for certain improvements in the construction of water closets.—23d September. Two months.

ON ROADS, CANALS, AND RAILWAYS.

The immense advantages that result to a country from having rapid, cheap, and regular modes of conveyance, have been admitted by the most enlightened politicians in all ages. The exchange of manufactured articles for the products of agriculture, at a rate of cost but very little more than their value where they are produced, must tend, under a proper system of government, to bring, not only the necessaries of life, but comforts and even superfluities within the reach of every individual.

So sensible were the ancient Romans of the importance of rapid conveyance, that all the cities of their vast empire were united by roads far superior to any that have been executed in later times, and of a much more expensive kind, than the best rail-roads in this country. The Roman roads were made so firm and solid that they have not yet entirely yielded to the dilapidations of fifteen centuries. Their total extent, according to Rondelet, was about 48,000 English miles.

After the decline of the Roman empire, the construction of good roads were generally neglected, and, in later times, canals have been employed as the chief artificial means of conveyance, as affording much greater facilities for the transmission of heavy burthens than any other mode, especially where great celerity is not required. Canals have, however, these disadvantages; a competent supply of water is necessary, which is not always obtained without incurring great expense; a canal is limited to comparatively small changes of level; otherwise, the delay and expenses of locks become too great. Canals are likewise liable to frequent stoppages from frosts, floods, repairs; they interfere with the right of streams and drainage, and are generally injurious to the property through which they are made. The first cost of canals, as well as the keeping of them in repair, are greater than those of railways: and the former are only preferable to the latter on a level surface, and where a greater speed than three miles per hour is not desirable, as a much greater weight can be moved at that velocity on a canal, than on a railway, with a given power. The following table which shews the work that may be performed by the same mechanical power on canals, railways, and turnpike roads, places the subject in a very clear point of view.

Velocity of Motion in Miles per Hour.	On a Canal.	On a level Railway.	On a level Turnpike Road.
2½......	55,500	14,400	1,800
3	38,542	14,400	1,800
3½......	28,316	14,400	1,800
4	21,680	14,400	1,800
5	13,875	14,400	1,800
6	9,635	14,400	1,800
7	7,080	14,400	1,800
8	5,420	14,400	1,800
9	4,282	14,400	1,800
10	3,468	14,400	1,800
13·5	1,900	14,400	1,800

of water should be determined into these barrels, with a force capable of overcoming the resistance of the valve, then a corresponding portion of water passes into an iron cylinder, about *seven or eight inches wide*, and two feet long, and immediately flashes into steam; this part of the machine is called the seperatory."

All your scientific readers will immediately perceive that this last (and by far the most important to a steam carriage) of the "happy series," is the invention of the ingenious Mr. Perkins, with the alteration only of Mr. Perkins's term of "*safety chamber*," into that of "*seperatory*." The name of *safety* chamber excited so much risibility among the friends of Mr. Perkins, who properly considered it the *danger* chamber, that Mr. Perkins has lately ceased calling it by that name. With regard to this brilliant and original discovery, Mr. Herapath says, "The dreadful consequences of boiler bursting are annihilated by a judicious application of tubular boilers. Should, indeed, a tube burst, a hiss about equal to that of a hot nail plunged in water contains the sum total of alarm, which a few strokes of a hammer will set all to rights again."

While I agree with Mr. Herapath, that no danger is to be apprehended from the small tubes, or gun-barrels, I do hope that he will take my advice, and in future keep at a respectful distance from the "seperatory," alias "safety chamber," alias "danger chamber." The first name is perhaps as good as any, as it is calculated to cause a final separation of the constituent parts of the bodies of those persons who should have the temerity to trust to the safety valves, notwithstanding Mr. Herapath assures them that these valves afford the "ultimatum of security."

Accidental circumstances may, and do sometimes, cause the bursting of boilers, however strong in their structure, and however ingeniously guarded by safety valves. All sensible men have in consequence considered it as a desideratum in mechanics to construct a boiler, so that, if it does burst, no harm shall result. The effect of the sudden liberation of steam and hot water will be in proportion to their quantity; therefore, when boilers are formed entirely of small tubes, safety valves are comparatively unnecessary, (although they are very useful in measuring and regulating the force of the steam), because no harm can result from the opening or bursting of a tube. Although great difficulties have been found in adapting tubular boilers to the regular supply and working of an engine, all scientific men are agreed upon their perfect security. The public have been led to consider this fact as an axiom in mechanics; taking, therefore, advantage of this circumstance, Mr. Herapath tells the public, that Mr. Gurney's boiler being constructed by a judicious application of tubes, "*the dreadful consequences of boiler bursting are annihilated.*" Now, is this assertion true, or is it false? The public are *deeply* interested in the decision of this question. Why has Mr. Herapath omitted to describe this "judicious application of tubes," which must of course be the happiest of the "happy series?" Is it that he knows the invention to be Mr. Perkins's, placed under circumstances of greatly increased risk? or is it that he wishes to avoid the

naming of the "seperator," and make the public believe that there is no "danger chamber" for the knowledge of which we are indebted to the candour of Dr. Wilkinson. Were there no vessels larger than the gun-barrels mentioned, I should consider the boiler perfectly safe, and should have no objection to have a seat on the top of it in cold weather; but if Mr. Gurney persists in using his "seperatory," which has an area about one hundred times greater, I should prefer a seat, even on thorns, half a mile off; for, to use the words of Mr. Herapath, I should *then* consider "*the danger to be apprehended in going over rough pitching, from too rapid a generation of steam,*" to be really imminent.

Having, I trust, satisfactorily shown, that every one of the "happy series of inventions" mentioned by Mr. Herapath as constituting Mr. Gurney's carriage, were the inventions of other men, and that many of those inventions are not the happiest imaginable, I shall here conclude.

I am, Sir, most respectfully,
Your obedient Servant,
LUKE HEBERT.

No. 20, Paternoster Row, 19th September, 1829.

TRANSACTIONS OF THE SOCIETY OF ARTS, &c.

FOR THE YEAR 1828.

(Continued from page 60.)

FLOATING BRIDGE.—The *large silver medal* was awarded to H. W. Hood, Esq., commander of the Hyperion frigate, for a floating bridge. This ship, during the last three years, has been stationed in the harbour of Newhaven, for a particular service, in which it is very important that ready access should be had at all times from the ship to the shore. But although the vessel is moored within a short distance of the wall of the harbour, the bed of mud is so deep as to be wholly impassable, and the only time that communication could be maintained with the shore was at high water, by means of boats. As the service entrusted to Captain Hood was materially impeded by this obstacle, he set himself to form a bridge by means of the cables, casks, gratings, and other articles, with which every ship of war is necessarily provided, and the result is a secure bridge, easily accessible at any time of the tide, though the difference between high and low water in the harbour of Newhaven is not less than 22 feet. There are many similar situations, both at home and abroad, where it may be expedient to station ships of war, and in all such cases commander Hood's invention will be found of great advantage.

Two lengths of the bower chain-cable were placed parallel to each other over the mud, and at right angles with the ship's length, and her fish davits were sunk in the mud as posts, to set the cables up to; at the extreme ends from the piles, near the ship, a series of

of water should be determined into these barrels, with a force capable of overcoming the resistance of the valve, then a corresponding portion of water passes into an iron cylinder, about *seven or eight inches wide*, and two feet long, and immediately flashes into steam; this part of the machine is called the seperatory."

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FOR THE YEAR 1828.

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petition should weigh not more than six tons, and be capable of drawing after it, day by day, on a level plain, a train of carriages of a gross weight, equal to three times the weight of the engine itself, at a rate of not less than ten miles per hour, with a pressure of steam in the boiler not exceeding 50lb. on the square inch. 2. That the engine and boiler should be supported on springs, and rest on six wheels, and the height from the ground to the top of the chimney should not exceed 15 feet. 3. That the engine should "effectually consume its own smoke;" and 4. That there should be two safety-valves, one of which should be completely out of the reach of the engine-man's interference.

The gentlemen appointed by the Directors to act as judges on the occasion, were, J. U. Rastrick, Esq., of Stourbridge, civil engineer, Nicholas Wood, Esq., of Killingworth, civil engineer, (author of the work on railways), and John Kennedy, of Manchester.

The portion of the railway chosen for the "running ground" was on the Manchester side of Rainhill Bridge, (about nine miles from Liverpool), where the railway runs for two or three miles on a dead level.

Early on Tuesday, the day of competition, great crowds of people were assembled from all parts, to witness the sight. There were many individuals who had come hundreds of miles for no other purpose; and, as may readily be supposed, these were not idle spectacle hunters, but chiefly engineers and men of science capable of appreciating, in its full extent, the great importance of the exhibition.

The number of competitors was at first reported to be ten, and we have reason to know there was at least as many engines as this in preparation. In this new sort of race, however, as in others, there were some withdrawn, and some prevented by accidents from making their appearance; and the number was reduced, on the morning of trial, to five, who were thus described in the official list of *the running coaches*:—

No. 1. Messrs. Braithwaite and Ericsson, of London; "The Novelty;" copper and blue; weight, 2 tons, 15 cwt.

2. Mr. Ackworth, of Darlington; "The Sans Pareil;" green, yellow, and black; weight, 4 tons, 8 cwt., 2 qrs.

3. Mr. Robert Stephenson, of Newcastle-upon-Tyne; "The Rocket;" yellow and black; white chimney; weight, 4 tons, 3 cwt.

4. Mr. Brandreth, of Liverpool; "The Cycloped;" weight, 3 tons; worked by a horse.

5. Mr. Burstall, of Edinburgh; "The Perseverance;" red wheels; weight, 2 tons, 17 cwt.

The engine which made the first trial, was, the "Rocket" of Mr. Robert Stephenson (the son, we believe, of Mr. George Stephenson, the engineer of the railway.) It is a large and strongly-built engine, and went with a velocity, which, as long as the spec-

tators had nothing to contrast it with, they thought surprising enough. It drew a weight of 12 tons, 9 cwt. at the rate of 10 miles 4 chains in an hour, (just exceeding the stipulated maximum,) and, when the weight was detached from it, went at a speed of about 18 miles an hour. The faults most perceptible in this engine, were, a great inequality in its velocity, and a very partial fulfilment of the condition that it should "effectually consume its own smoke."

The next engine that exhibited its powers, was, "The Novelty" of Messrs. Braithwaite and Ericsson. The great lightness of this engine (it is about one-half lighter than Mr. Stephenson's), its compactness, and its beautiful workmanship, excited universal admiration; a sentiment speedily changed into perfect wonder, by its truly marvelous performances. It was resolved to try first its speed merely; that is, at what rate it would go, carrying only its compliment of coke and water, with Messrs. Braithwaite and Ericsson to manage it. Almost at once it darted off at the amazing velocity of 28 miles an hour, and it actually did one mile in the incredibly short space of one minute and 53 seconds! Neither did we observe any appreciable falling off in the rate of speed; it was uniform, steady, and continuous. Had the railway been completed, the engine would, at this rate, have gone nearly the whole way from Liverpool to Manchester within the hour; and Mr. Braithwaite has, indeed, publicly offered to stake a thousand pounds, that, as soon as the road is opened, he will perform the entire distance in that time.

It was now proposed to make a trial of the "Novelty," with three times its weight attached to it; but, through some inattention as to the supply of water and coke, a great delay took place in preparing it for its second trip, and, by the time all was ready, the day was drawing so near to a close, that the Directors thought it proper to defer the prosecution of the competition till the following day.

It has been seen, from the first day of this competition, that Mr. Wood has been spared to see, not only what he declared to be "ridiculous" and "nonsense," reduced to an unquestionable matter of fact, but of witnessing something so much more extraordinary, that had any one hinted it to him in his days of incredulity, he would, we presume, have pronounced it to be absolute madness. The least powerful of the two engines which then exhibited reached nearly the highest degree in Mr. Wood's scale of "nonsense," having gone without any load at the rate of about eighteen miles an hour; while "The Novelty" of Messrs. Braithwaite and Ericsson actually realized almost double that speed!

Second Day, 7th October.

"The Novelty" engine of Messrs. Braithwaite and Ericsson was this day tried with a load of three times its weight attached to it, or 11 tons, 5 cwt.; and it drew this with ease at the

rate of 20¾ miles per hour: thus proving itself to be equally good for speed as for power. We took particular notice to-day of its power of consuming its own smoke, and did not any time observe the emission of the smallest particle from the chimney.

The weather now became wet, and the rail-ways clogged with mud, which made it necessary to suspend the prosecution of the experiments before the day had half elapsed. The attendance of spectators this morning was by no means so numerous as on the preceding day; but there were few of those absent—the engineers, men of science, &c.—whose presence was most desirable.

Third Day, 8th October.

Before the commencement of the experiments to-day, it was announced that the judges on re-considering the card of "Stipulations and Conditions" originally issued, and of which we gave the substance last week, had considered them so defective as to make it necessary to substitute the following:—

"TRIAL OF THE LOCOMOTIVE ENGINES.

Liverpool and Manchester Rail-way.

"The following is the ordeal which we have decided each locomotive engine shall undergo, in contending for the premium of £500, at Rainhill.

"The weight of the locomotive engine, with its full compliment of water in the boiler, shall be ascertained at the weighing machine, by eight o'clock in the morning, and the load assigned to it shall be three times the weight thereof. The water in the boiler shall be cold, and there shall be no fuel in the fire-place. As much fuel shall be weighed, and as much water shall be measured and delivered into the tender-carriage, as the owner of the engine may consider sufficient for the supply of the engine for a journey of thirty-five miles. The fire in the boiler shall then be lighted, and the quantity of fuel consumed for getting up the steam shall be determined, and the time noted.

"The tender-carriage, with the fuel and water, shall be considered to be, and taken as a part of the load assigned to the engine.

"Those engines that carry their own fuel and water, shall be allowed a proportionate deduction from their load, according to the weight of the engine.

"The engine, with the carriages attached to it, shall be run by hand up to the starting-post; and as soon as the steam is got up to fifty pounds per square inch, the engine shall set out upon its journey.

"The distance the engine shall perform each trip, shall be one mile and three-quarters each way, including one-eighth of

a mile at each end for getting up the speed, and for stopping the train; by this means the engine with its load will travel one and a half mile each way at full speed.

"The engine shall make ten trips, which shall be equal to a journey of thirty-five miles; thirty miles whereof shall be performed at full speed, and the average rate of travelling shall not be less than ten miles per hour.

"As soon as the engine has performed this task, (which will be equal to the travelling from Liverpool to Manchester,) there shall be a fresh supply of fuel and water delivered to her; and as soon as she can be got ready to set out again, she shall go up to the starting-post, and make ten trips more, which will be equal to the journey from Manchester back again to Liverpool.

"The time of performing every trip shall be accurately noted, as well as the time occupied in getting ready to set out on the second journey.

"Should the engine not be enabled to take along with it sufficient fuel and water for the journey of ten trips, the time occupied in taking in a fresh supply of fuel and water, shall be considered and taken as a part of the time in performing the journey.

J. U. Rastrick, Esq. Stourbridge, C. E.
Nicholas Wood, Esq. Killingworth, C. E.
John Kennedy, Esq. Manchester.
} Judges.

"Liverpool, Oct. 6, 1829."

The engine which exhibited on this the third day was "The Rocket" of Mr. Stephenson. The trial was conducted in the manner laid down in the "Ordeal" we have just quoted; and it was understood on all hands that this trial should be considered decisive of its merits.

The engine, with its complement of water in the boiler, weighed 4 tons 5 cwt. and the load attached to it was 12 tons 15 cwt., or including a few persons who rode, about 13 tons. The journey was 1½ mile each way, with an additional length of 220 yards at each end to stop the engine in, making in one journey 3½ miles. The first experiment was for 35 miles, which is exactly 10 journeys, and, including all the stoppages at the ends, was performed in 3 hours and 10 minutes, being upwards of 11 miles an hour. After this a fresh supply of water was taken in, which occupied 16 minutes, when the engine again started, and ran 35 miles in 2 hours and 52 minutes, which is upwards of 12 miles an hour, including all stoppages. The speed of the engine, with its load, when in full motion, was, at different times, 13, 13½, 14, and 16 miles an hour; and, had the whole distance been in one continued direction, there is little doubt but the result would have been 15 miles an hour. The consumption of coke was on an average about half a ton in the 70 miles.

SOUTH-WALES WINE.—The *Gold Ceres Medal* was awarded to Gregory Blaxland, Esq. of Sydney, New South Wales, for a sample of wine, the produce of his own vineyard in that colony. Five years ago, the *large Silver Medal* was conferred on this gentleman, for a sample of wine from the same vineyard. The vines with which it is stocked, are derived from a small black cluster grape, supposed to be a seedling from one of the claret grapes, originally introduced by Mr. Blaxland. Being a native of that colony, it endures the climate far better than any of the imported vines. The wine sent this year is decidedly better than that for which the former reward of the Society was granted. It cannot be expected, that the produce of such young vines should have much flavour; but as the stocks get older, and less succulent, the quality of their juice will, no douht, improve. At present, it is praise enough, that the wine is sound, and perfectly free from that flavour which characterises, not advantageously, the wines of the Cape of Good Hope.

LIST OF NEW PATENTS SEALED.

LOCKS.—To G. H. Manton, of Dover Street, Piccadilly, for an improvement in the construction of locks for fire-arms.—Dated 2nd September. Specification to be enrolled in Two months.

CANNON.—To J. Tucker, of Hammersmith, for certain improvements in the construction of cannon.—9th September. Six months.

MACHINERY.—To T. S. Brandreth, of Liverpool, for a new method or methods of applying animal power to machinery.—9th September. Six months

FIRE-PLACES.—To J. A. Fonzi, Esq., of Upper Marylebone Street, for certain improvements on, or additions to, fire-places.—9th September. Six months.

LIGHT.—To J. Soames, Junr. of Wheeler Street, Spitalfields, for a new preparation or manufacture of a certain material produced from a vegetable substance, and the application thereof to the purposes of supplying light.—9th September. Six months.

IRON PLATE.—To T. Morgan, of Tipton, for a new method of manufacturing or preparing iron plate.—9th September. Six months.

POWER AND MOTION.—To R. Torrens, of Croydon, for certain apparatus for the purpose of communicating power and motion.—9th September. Six months.

FIRE-ARMS.—To D. Lawrence, of Strood, and J. Crundwell, of Ashford, for certain improvements in apparatus to be applied to fowling-pieces and other fire-arms.—15th September. Six months.

ROPES, CORDAGE, &c.—To G. Harris, R. N. of Bromptom Crescent, Middlesex, for improvements in the manufacture of ropes, cordage, canvas, &c.—15th September. Six months.

DRESSING STONES.—To John Milne, Edinburgh, for a machine or engine for dressing of stones.—15th September. Six months.

CANE JUICE.—To James Atchison, Clyde Buildings, Glasgow, for certain improvements in the concentrating and evaporating of cane juice, &c.—15th September. Six months.

PAPER.—To Thomas Cobb, Esq. Calthorpe House, Oxford, for certain improvements in the manufacture of paper for the hanging rooms, &c.—15th September. Six months.

TIME-KEEPERS.—To T. Westwood, of Princes Street, Leicester Square, for certain improvements in watches and time-keepers.—23d September. Six months.

WATCHES.—To I. Brown, of Gloucester Street, Clerkenwell, for certain improvements applicable to watches.—23d September. Two months.

WATER CLOSETS.—To H. Tyler, of Warwick Lane. for certain improvements in the construction of water closets.—23d September. Two months.

ON ROADS, CANALS, AND RAILWAYS.

The immense advantages that result to a country from having rapid, cheap, and regular modes of conveyance, have been admitted by the most enlightened politicians in all ages. The exchange of manufactured articles for the products of agriculture, at a rate of cost but very little more than their value where they are produced, must tend, under a proper system of government, to bring, not only the necessaries of life, but comforts and even superfluities within the reach of every individual.

So sensible were the ancient Romans of the importance of rapid conveyance, that all the cities of their vast empire were united by roads far superior to any that have been executed in later times, and of a much more expensive kind, than the best rail-roads in this country. The Roman roads were made so firm and solid that they have not yet entirely yielded to the dilapidations of fifteen centuries. Their total extent, according to Rondelet, was about 48,000 English miles.

After the decline of the Roman empire, the construction of good roads were generally neglected, and, in later times, canals have been employed as the chief artificial means of conveyance, as affording much greater facilities for the transmission of heavy burthens than any other mode, especially where great celerity is not required. Canals have, however, these disadvantages; a competent supply of water is necessary, which is not always obtained without incurring great expense; a canal is limited to comparatively small changes of level; otherwise, the delay and expenses of locks become too great. Canals are likewise liable to frequent stoppages from frosts, floods, repairs; they interfere with the right of streams and drainage, and are generally injurious to the property through which they are made. The first cost of canals, as well as the keeping of them in repair, are greater than those of railways: and the former are only preferable to the latter on a level surface, and where a greater speed than three miles per hour is not desirable, as a much greater weight can be moved at that velocity on a canal, than on a railway, with a given power. The following table which shews the work that may be performed by the same mechanical power on canals, railways, and turnpike roads, places the subject in a very clear point of view.

Velocity of Motion in Miles per Hour.	On a Canal.	On a level Railway.	On a level Turnpike Road.
2½	55,500	14,400	1,800
3	38,542	14,400	1,800
3½	28,316	14,400	1,800
4	21,680	14,400	1,800
5	13,875	14,400	1,800
6	9,635	14,400	1,800
7	7,080	14,400	1,800
8	5,420	14,400	1,800
9	4,282	14,400	1,800
10	3,468	14,400	1,800
13·5	1,900	14,400	1,800

The engine now started to do the 70 miles for a continuance; but just as it had completed its second trip of three miles, when it was working at the rate of 15 miles an hour, the new cement of some of the flanges of the boiler, yielded to the high temperature to which it was exposed, and the spectators had again the mortification to hear it announced that it was, under these circumstances impossible the trial could go on.

Mr. Burstall's engine, "The Perseverance," which had met with an injurious accident on its way to Liverpool, but been since repaired, was now allowed to make some experimental trials. We left it returning from a third or fourth trip; but if we may judge from the degree of speed which it then exhibited, not more, certainly, than five miles per hour—it has no chance.

After this period, Messrs. Braithwaite and Ericsson intimated to the judges, that as the joints of "The Novelty" which had given way, could not be restored to a working state before the lapse of, at least, eight days, and the prolongation of the competition was likely to be attended with great inconvenience to many parties, they would withdraw their engine from any further trial, and "leave it to be judged of by the performances it had already exhibited."

"The Novelty" still remains at Liverpool, and Messrs. Braithwaite and Ericsson have publicly announced, that as soon as it is repaired, and the cement of the joints sufficiently hardened, they will, (with the leave of the Directors), complete the exhibition of its powers, and show that, but for the accidents which it unfortunately met with, it was more than equal to the accomplishment of the task that was last assigned to it.

It is said that the prize will not be positively decided for some time yet to come, as the *judges* have not the power of *adjudging*, the Directors of the company reserving to themselves that power. The following observations on this subject we copy from the "Liverpool Mercury."—

We may consider the trial of the locomotive engine as now virtually at an end. It is much to be regretted, that "The Novelty" was not built in time to have the same opportunity of exercising that Mr. Stephenson's engine had, as that there is not in London, or its vicinity, any railway where experiments with it could have been tried. It will evidently require several weeks to perfect the working of the machine, and the proper fitting of the joints; and, under this impression, Messrs. Braithwaite and Ericsson have acted wisely in withdrawing, as they have done, from the contest.

"The course is thus left clear for Mr. Stephenson; and we congratulate him with much sincerity on the probability of his being about to receive the reward of £500. This is due to him for the perfection to which he has brought the old-fashioned locomotive engine; but the GRAND PRIZE OF PUBLIC OPINION is the one which has been gained by Messrs. Braithwaite and Ericsson,

for their DECIDED IMPROVEMENT IN THE SAFETY, simplicity, and the smoothness and steadiness of a locomotive engine; and however imperfect the present works of the machinery be, it is *beyond a doubt, and we believe we speak the opinion of nine-tenths of the engineers and scientific men now in Liverpool, that it is the principle and arrangement of the London engine which must be followed in the construction of* all *future locomotives!!!*.

While we differ most decidedly from the Editor of the "Liverpool Mercury" on these points, we think it better, before we state the grounds of our objection, to give the descriptions of the competing engines.

"THE ROCKET," constructed by Robert Stephenson, jun. Esq. differs but little in appearance from its rude predecessors, as will be seen by reference to our plate VII. fig. 8, which exhibits an external elevation of it. Our contemporary describes it as follows:

"The furnace A is two feet wide by three feet high; the boiler B is six feet long and three feet in diameter. The furnace, like that of "The Novelty," has an external casing, between which and the fire-plate there is a space of three inches filled with water, and communicating with the boiler. The heated air from the furnace is circulated through the boiler by means of twenty-five copper pipes of three inches each in diameter, which have their termination in the tall chimney C. F G are safety-valves; H H the steam-eduction pipe. D one of two steam cylinders which are placed on an inclined position, and embrace, like two arms, the boiler between them. E one of the connecting rods which give motion to the wheels; *a*, the slide-valves; and *o*, one of two escape-pipes. M is part of the tender appropriated to the carriage of fuel; N the water-cask.

"We observed in our first notice of this engine, that it exhibited but a very partial fulfilment of the condition that it should "*effectually consume its own smoke.*"

"THE NOVELTY" constructed by Messrs. Braithwaite and Ericsson, which excelled, while it lasted, Mr. Stephenson's carriage so much in speed, does not appear to us to possess, in its essential parts, much of that character which its name indicates; however its internal appearance may differ from the ugly tea-pot forms of those generally used in the coal districts.

The diagram given at fig. 3, plate VII. will serve to explain the principal arrangements in its construction.

S is the furnace surrounded by the water contained in the boiler, and F is a hopper to supply the fuel, by allowing it to drop down the large central tube underneath; M is the ash-pit, through which air is forced by the pipe K from the bellows C, worked by the engine. This furnace is entirely enclosed in the boiler, which is of the form represented at E E E, and the flue from the furnace consists of a long tapered pipe, which winds twice or thrice up and down the whole length of the horizont l

part of the boiler, before it escapes into the chimney pipe Q. The furnace S has therefore a direct action upon the boiler surrounding it, and the temperature of the water in the long horizontal part, is raised by the heated air which passes along the flue-pipe. A is the steam chamber. D the working cylinder, of which there are two. The dotted line B shows the situations, of the water tank; and the dotted circles, those of the running wheels, to one pair of which, the power from the engine is applied in the usual manner. The carriage frame is fixed upon springs, and the machinery generally is said to be of highly finished workmanship. The wheels are the patent suspension wheels, of Theodore Jones, and Co.

Now, we cannot for the life of us, discover any thing about this "NOVELTY" that is not common to other locomotives, except the steam-producing apparatus; and this apparatus, considered distinctly from the carriage, has but little *Novelty*;* and regarded as forming a portion of it, it is extremely *faulty*. Indeed, if it be true what the Editor of the "Liverpool Mercury" asserts, that, "*it is the principle and arrangement of this London engine, which will be followed in the construction of all future locomotives*, we feel it a duty we owe to the good people of Liverpool, to tell them that if they do not take our warning they will probably share a worse fate than the congregation of a certain over-zealous parson, who made the drowsy sinners *feel* the weight of the gospel, since they would not *hear* it: and to the wicked people of Manchester we would merely say, "if the principle of large steam-chambers in locomotive engines be adopted, ye have more to fear from that, than from the swords of all your Peterloo yeomanry."

We need not tell the scientific reader that the great steam-chamber A, in Messrs. Braithwaite and Ericsson's carriage, renders it a highly dangerous machine, quite sufficietly so, without resorting to a constant powerful blast, to increase the fierceness of the fire. The causes of the explosions of boilers has already been so ably and clearly pointed out by the ingenious Mr. Perkins,† and it would be indeed difficult to contrive a working boiler, in which the elements of mischief could be more fearfully put together, than the one we are speaking of. Should any little matter interfere with the proper action of the pumps, and cause the water to fall so as to uncover the sides, or the top of the furnace, the blast would make the metal red hot in a few seconds; upon the renewal of the action of the pumps, or from a sudden splashing of the water by a jolt over the red hot metal, the whole machine, and every body near it would most probably be blown to atoms. It was indeed a most felicitous circumstance

* It has been almost universally used in France, "time out of mind," for heating baths; and in England under endless modifications for evaporation generally.—ED.

† See Register of Arts, &c.

that the boiler gave way where it did. We may compare it to the saving of a man's life from the discharge of a pistol, by its flashing in the pan. The great high pressure steam-chamber used by Mr. Gurney in his locomotive carriage, which he has so significantly termed a "SEPARATORY" we thought quite bad enough,* but this (literally and truly) *blasted* chamber of Messrs. Braithwaite and Ericsson, is far more deserving of that curious cognomen, than Mr. Gurney's.

The law limits the quantity of gunpowder to be kept in a private house, and it is perhaps not politic to prevent a man from blowing himself up if he likes it, but he ought not to be allowed to blow other people up unless they express a *penchant* for it. The expansive force of high-pressure steam being equal to that of gunpowder, the public require protection from the misuse of the former as much as from that of the latter. Thousands of persons have already perished from the injudicious management of high-pressure steam, and it is truly lamentable to think that many more lives will probably be sacrificed before the attention of Parliament is called to the subject. Mr. M. A. Taylor has already distinguished himself by legislating for the suppression of one great nuisance arising from the mismanagement of steam-engines; were he to take this matter up, he would do himself greater honour still, as steam-locomotives will very soon be common on the public roads. It would not be a difficult matter to make some regulations, by which the public would be secured against those *catastrophes which are sure to happen* for want of them. Indeed we are persuaded that the very proposition would lead to the adoption of such improved arrangements in the structure of boilers as to render serious accidents from explosion almost impossible.

We cannot imagine how the dangerous steam magazine we have alluded to can have escaped the attention of our intelligent contemporary to whom we stand so largely indebted in the present article. The accident, by which Messrs. Braithwaite and Ericsson were *compelled* to give up the contest, is to our minds, if any thing had been wanting to confirm it, decisive proof of the improper construction of the boiler. The following is the account given in the Mechanics' Magazine of the accident:—

"It is now fitting we should explain more particularly, than has yet been done, the cause of those accidents, by which some doubt has been for the moment thrown on the soundness of that principle. The engine, it appears, has been got up in a hurry, having been began and finished within the short space of six weeks immediately preceding the competition, and had never been subjected to any sort of proof. It was not to be expected therefore that it should be found perfect at all points. The part which was first observed to perform its office insufficiently was the pipe of the feed-pump; and the consequence was that the water, which it is the business of this pump to keep always at the height marked in our sectional sketch,

* See our answer to Mr. Herapath on this subject, in our last Number.

sunk below the level of the flue of the furnace, which flue being thus left exposed to a dry temperature of high elevation gave way near to the flange *a*. In order to get at this damaged part of the flue, it was necessary to lift off the steam-chamber *a*, and for this purpose to undo the joints *b*, *c*, *d*, and *e*. To renovate the flue was an easy matter, but not so to restore the joints all at once to the state in which they previously were. The cement with which they were re-secured would have required a week at least to harden properly; but it was as yet scarce twelve hours' old when the engine started to perform the task assigned to it. As might have been naturally expected, the joints yielded to the high temperature (300°) to which they were exposed, the steam began to escape at all points, and the efficiency of the engine was for the time and occasion at an end.

"The impartial reader will see nothing in any part of these mischances tending in the least to discredit the principle on which 'The Novelty' is constructed. It was not the peculiarity of that principle which caused either the defective feed-pipe to go wrong, or the unduly-exposed flue to crack, or the green joints to give way. The principle worked admirably as long as every part of the machinery stood firm, and had fair play; nor can a doubt be reasonably entertained, that had the engine been previously proved (as cannon and muskets are proved), and been kept in good working order, it would upon the trial for a continuance have fully realized the expectations which its previous performances had excited. The grand point on which its superiority depends had already been fully established, namely, that it can generate a greater quantity of steam in a given time than was ever before produced by any apparatus of equal capacity. No further trial was wanted to show that what it could do for one hour in this respect, it would do for any number of hours. There might be errors committed in estimating the quantity of water and fuel requisite for a long journey, but there could be none in assuming that the power of the air-forcing pump to augment the heat and accelerate the circulation of the heated air, must, of necessity, remain the same, whether the journey is short or long. Every thing needful for the manifestation of the master-principle of the engine had been done; and all that was left unaccomplished, was but such a practical display as might convince those who, unable to appreciate principles, look only to results."

That we differ entirely in opinion from our contemporary we need not repeat, and we have only added his statements and observations in order that both sides may be heard. Messrs. Braithwaite and Ericsson may indeed congratulate themselves in having such able and influential advocates as the editors of "The Liverpool Mercury," and "The London Mechanics' Magazine."

[Note.—*The Directors have since made their Report, and adjudged the prize of £500 to Mr. STEPHENSON.*]

LAW OF PATENTS.

Annexed will be found a part of the Evidence given before the Select Committee of the House of Commons, appointed in April last, to inquire into the state of the law and practice relative to the granting of patents for inventions, and to report their observations thereupon to the House, together with the minutes of evidence taken before them. The only report made by the Committee is, that the subject is in its nature so intricate and important, that it occasioned the necessity of examining witnesses at great length, and that at so late a period of the session, they were only prepared to report the evidence, and to recommend to the House that the inquiry be resumed early in the next session of parliament. What the Committee may therefore ultimately recommend, it is impossible to say; but in the mean time no one can, assuredly, question the importance of the subject, or the very urgent necessity of investigating it under every form. The first and most flagrant evil of the present law is, that it is not protective, but oppressive—that it encompasses the author of an invention not only with difficulties and expenses, wholly uncalled for by the necessity of the case, before he can secure a patent for it, but that it exposes him to depredation by every rogue and impostor who may choose to blast his invention, or set up a prior claim to it, before the patent has been sealed. And how is this to be obviated? A man of plain common sense would, undoubtedly, say, by doing away with all expenses but those which are absolutely necessary to reimburse those employed in forwarding this business, and granting to the first lodger of a specification of an invention, the most complete protection against all but those who could prove the prior employment or discovery of a similar process or invention; and this proof, we will affirm, ought to be submitted, not to a court of law, where great and repeated expense must be incurred, and where those who preside, judges, jurors, and lawyers, are, all of them, generally incompetent to decide on its merits, but to a jury of scientific men chosen at random, and whose sentence ought to be final, and without expense to the parties.

Such at least is the opinion of those who have thought most deeply on the subject; but, as the question is important and not yet decided, our pages shall be open to communication which recommend a different policy. In the mean time the evidence taken before the Select Committee will be found interesting, and to that we now direct the attention of our readers.

Mr. Francis Abbott *being called on,*

Stated to the Committee the process of taking out a patent from the first application at the secretary of state's office, or from the first putting in the petition, to the final sealing of it.—"It is sometimes usual," he observed, "although not necessary, to enter a caveat as the first step, as a precaution that a patent shall not be run against the applicant, as soon as it is known he is applying; for there have been instances where somebody else have got a patent on

the same subject, while he has been, for some cause or other delayed: after entering the caveat, or without entering the caveat, an affidavit is made by the person, that he has either invented, or has had communicated to him by a foreigner, some discovery. Having made that affidavit, a petition is presented to the King, praying a grant of letters patent for England, Wales, and Berwick-on-Tweed, or with the addition of the Colonies; the colonies are frequently omitted because it is attended with some extra expense, and in many inventions it would be of no use to embrace the colonies; that petition being presented to the king, through the secretary of state, a reference is made by the secretary of state in the name of the king, to the attorney or to the solicitor-general to report, who makes a report in favour of the application if it is not stopped by any caveats; the clerk looks over the books, and finding any caveat for a patent on the same subject, the applicant is delayed a week from the time, that notice is given for those who have received notices on their caveat, to decide whether they will oppose or not, if within that week the person having had notice says he shall oppose; the next step is to take out a summons for the hearing before the Attorney or Solicitor-General; a week's notice more is given of that appointed time, when he hears the parties if they attend; but it is too frequently abused by the parties who have said they should oppose, not opposing, and sometimes a patent is thus delayed a fortnight or three weeks; and instances have arisen where patentees have been brought some hundreds of miles to support their application, and, when arrived, no opposing party has appeared. In a very recent case I was applying for a patent, and was delayed near a month just in that way. If the parties attend, they are heard before the Attorney or Solicitor-General, first the applicant, and then the opponent; and then, if he sees any reason to think there is an interference, he stops it; he exercises his own discretion on it, governed, of course, by what transpires on the examination of both the parties; if he thinks there is no interference between the applicant's and opponent's invention, he makes his report in favour of the application; that report is taken back to the Secretary of State's Office, for what is called the King's warrant; that warrant recites, shortly, that such a person has applied for a patent, and that the King is advised to grant it; and he, in general terms, directs the the Attorney-General to prepare a patent for the King's signature; the warrant, as it is called, is then taken back to what is called the Patent Bill Office; it is still under the Attorney and the Solicitor-General, in an office, exclusively appropriated to the engrossing of patent bills; in the course of a week, or sometimes more, the bill is prepared and signed by the Attorney or Solicitor-General, and taken back for the King's signature to it, and is then called "the King's Bill:" the King having signed, it goes to the Signet Office, where it passes, and then it is called "the Signet Bill;" from thence it goes to another office, when it undergoes the Privy Seal, then it is called "the Privy Seal Bill;" from the Privy Seal it goes direct to the Lord Chancellor's Office, and receives the Great Seal: originally it used to pass another stage, to the Hanaper, to pay the Hanaper fees

on it; it is not now taken to the Hanaper Office; but the Lord Chancellor's officer, the clerk of the patents at the Great Seal, receives the Hanaper fees, and pays them over; so that it does not now go to the Hanaper Office; and then it receives the Great Seal, if there be no caveat; if there is a caveat, notice is given on it, and if the party says he opposes, then the applicant has no means of getting rid of that caveat but by a petition to the Lord Chancellor, which, in modern times, is very rare. When I first began to pass patents, they were much more frequent, because, at that time, they were vexatiously resorted to in many instances, it being considered that the Lord Chancellor had no power to award expenses, however improper the opposition; but, about thirty years ago, after mooting the question several times before the Lord Chancellor, on a petition I presented, the expenses were ordered to be paid by the person who had either not sufficient grounds, or did not appear to support them; and, since it has been found that the expenses can be, and are frequently awarded at the Great Seal, the oppositions there are much less frequent than they used to be. When the caveat is removed, or, if there is no caveat, it passes the Great Seal, and then it is completed.

"That is the whole process as regards the English patent.

"In extending the patent to the Colonies, a little extra expence is incurred, but it does not alter the system in any way; it is only making the addition to the prayer of the petition; "And all your Majesty's colonies and plantations abroad;" it is attended with no extra trouble, but with an additional expense of perhaps six or seven pounds. I generally recommend it to be dispensed with, for I have in very few instances seen utility in extending the patent to the colonies."

The Committee have been informed, that when it is advisable to extend a patent to the colonies, if you include one of the colonies that has an independent Legislature, it is necessary to obtain the consent of that Legislature?—That has never occurred in my practice, and I was not aware of it; it is the first time I heard of such a practice.

Is not the mode of taking out a patent for Ireland precisely the same? The first step is a similar affidavit and petition to the King; the prayer only praying it for Ireland, instead of England, Wales, and Berwick-upon-Tweed; then it is referred to the Attorney and Solicitor-General in Ireland, and it goes to the Lord Lieutenant, the Attorney and Solicitor-General, I believe; and I think it goes to the Lord Lieutenant, who refers it to the Attorney and Solicitor-General; they make a report, and it comes back here for what is called the King's letter, something similar to the King's warrant on the English patent; that letter goes back to Dublin; then the patent goes through several offices, the minutiæ of which I cannot tell the Committee, without I had some documents to refer to.

All these formalities requisite for a person who has previously obtained a patent in England; and a similar process is adopted to obtain a Scotch patent. The Scotch patent passes a seal that is

called a "substitution for the Great Seal of Scotland," at Edinburgh; and the Irish patent passes the Great Seal at Dublin; the English one, the Great Seal here,—all three separate and distinct jurisdictions; nearly the same expenses are incurred in each; the Irish is rather more than the English, and the Scotch something less.

With respect to the English, there are so many circumstances that vary the amount, it is difficult to speak with precision; an English patent with one name only, and not extending to the colonies, including the fee for passing it, is about 110*l*.; the solicitor or agent, or whoever passes it, has always had a fee of ten guineas, (since I have been meddling with patents, more than thirty years,) which is included in the 110*l*.

The whole expense for the United Kingdom (England, Scotland, and Ireland), is 330*l*.

In answer to the inquiry what time it took to obtain the Great Seal to patents, Mr. Abbot said, the English patent depends much upon casualties; they used to be certainly more expeditiously obtained than they are now; sometimes, now, we are three months or more getting a patent. I have got two going on now, where, unless I get them to-day from the Secretary of State's, they have remained, I think, nearly a month waiting the King's signature to the warrant.

An Irish patent you can seldom get in less than five or six months; it is the more unaccountable, by reason that the royal signature is only required once for an Irish patent; they have it twice for an English patent, and it is only required once for a Scotch patent, and I cannot account for the great delay; every body who has had any thing to do in the business have felt the great inconvenience they are put to in getting a patent for Ireland, so much so, that I have often remonstrated, and had to press it on; I have frequently said, the patent is in danger of having the Irish patentee's right destroyed, inasmuch as he must specify in England, and any body may see that specification here on paying the office fees for search, and by sending over to Ireland the whole subject-matter of it, there is no patent right to prevent it being used there, and being used is completely destructive of the patent, if the patent has before that time passed the Great Seal.

The greatest delay arises when from any cause the royal signature cannot be obtained; in some instances, where the great officers of state are in the country, a patentee will have to wait a month or two, perhaps, for the Privy Seal, unless he will pay an extra considerable expense for a journey into the country.

I can get a Scotch patent, although I have to correspond with my agent in Edinburgh, much more expeditiously than I can an English patent; in ordinary cases about half the time: because the King's signature is only required once; as soon as the Lord Advocate of Scotland has made his report, similar to the Attorney-General's report in England, the King issues a warrant, as it is called, which is a substitution for the King's bill here; it differs a little in form.

The introduction of the Scotch form here would be a very great improvement. I am not aware of any practical objection.

When a caveat is entered before the Lord Chancellor, he has the power of awarding costs; the Attorney or Solicitor General also, to a certain extent, exercise that power, and it arose on a case of my own when Sir Samuel Romilly was solicitor-general. I had obtained his report in favour of the patent, and had gone back and got the king's warrant, directing the patent to be made out in the intervening time; a person getting by some means knowledge that the patent I was soliciting had been reported on, he came and claimed to be heard on a caveat. I submitted to Sir Samuel Romilly, that it was contrary to practice that a party should be heard at that stage; and in addition to that, he had put my party to an increased expenditure by not coming at an earlier stage, as he ought to have done; that was the first time it was ever admitted of permitting a party to be heard on the bill, as it is called; he then said, "I will let you, the opponent, in to be heard now; but it is upon this condition"—and ever since that, it has been the rule, "that you shall pay the expenses that the other party has hitherto incurred, if I am of opinion the application ought not to proceed, (and I think it has been subsequently altered to a further condition annexed to it,) and if I am not of opinion that it should be stopped, you shall pay the expenses of this hearing." I believe something of that kind in some modern cases has been done: since that time, any person coming in the second stage before the Attorney-General on the bill, he is now made to deposit; some of them, finding the Attorney-General had no judicial power to enforce the payment, refused to pay after they had been suffered to be heard. Well, then another remedy was adopted, "you shall deposit so much money, and thus it stands now."

The expense of a patent is increased, if taken out by several persons. On this ground, the charges in the Attorney-General's office is very little; the Secretary of State's office in each stage, there is £1. 7*s*. 6*d*. extra; I think there is some little extra expense at the Hanaper; there is there an extra expense of 2*s*. 6*d*. or something like that, in the Attorney-General's office; but there is a very large expense extra at the Signet and Privy Seal offices, for the addition of a name. In anticipation of the inquiry, I have extracted the charges made there, as I thought I should not be able to make myself so well understood by words as by putting it on paper, the difference of expense in respect of one name and of two; the expense on one name at the Signet office, is £4. 7*s*.; on two, it is £10 5*s*. 6d.: at the Privy Seal office, it is £4. 2*s*.; on two names, it is £10. 0*s*. 6*d*.: so that the addition at those two offices may be considered instead of £8. 9*s*., is about £20. 0*s*. 6*d*.

SIGNET OFFICE.	One Name.			Two Names.		
Fees and Stamps	£3	1	0	£7	13	0
Gratuity	1	1	0	2	2	0
Receiver and Assistant Clerk	0	5	0	0	10	6
	£4	7	0	£10	5	6

PRIVY SEAL OFFICE.	One Name.	Two Names.
Fees and Stamps	£2 16 0	£7 8 0
Gratuity	1 1 0	2 2 0
Record Keeper	0 5 0	0 10 6
	£4 2 0	£10 0 0

The expense is also increased before the Great Seal—the Chancellor two pounds odd; and an extra fee at the Hanaper, but I believe in no other respect; which is received by the patent clerk at the Great Seal office.

When an infringement of a patent takes place, the mode pursued by the patentee of preventing that infringement continuing is, by an application to the Court of Chancery for an injunction; but the injunction is always dissolved upon the application of the other party to try it; and the defence of a patent is one of the most expensive kinds of defences, on account of the kind of witnesses that are generally necessary; it has become the fashion of late to subpœna a number of eminent scientific men, some, perhaps, brought from a great distance. The expense of defending a patent has now become enormously great.

Evidence of Mr. John Farey.

Can you give the Committee any information of the expense necessary in taking out a patent?—I can state the sum totals; for England, I think, it will be found to amount to £120; for Scotland, perhaps, £100; and for Ireland, I think, more than £125; and there is a small increase if the patent for England includes the colonies. Those are the amounts I always state to those who apply to me for advice respecting the expediency of taking out patents, but those sums include an average of ingrossing and stamps for the specifications.

Does the charge vary with the length of the specification?—With the length and with the difficulty; but the charges that depend most upon its difficulty are not included in the above sums, because professional charges for advice and assistance, in bringing the invention to bear, and specifying it, vary in every degree; I have had them as high as £200. for one very intricate invention, where there were patents for all three kingdoms, and from that to as low as three guineas, where only an examination was required of what had been well prepared by the patentee himself; my brother drew up an average of all the charges we have made in the course of twenty years' business, and I think it amounted to about £20. for the specification and drawing to each invention; that was merely the professional charge for all the business relative to preparing the title of the patent, the draft of the specification and the drawings, with duplicate drawings on parchment for the office. The patent agent ingrossing the writing on parchment, and finding stamps. Inventors who employ me, very commonly require more of my professional assistance than merely to prepare their titles and specifications, viz. to advise and assist them to put their plans in execution, make them working drawings, find

find them proper workmen, tools, old machines to alter for first trials, and to assist at their experiments, &c. but such charges are not included in the above average.

When it is desired to extend a patent to the colonies, is there any difficulty with respect to those colonies that have colonial legislatures?—I believe that it requires an express act of the colonial legislature, to enable disputes on the patent right to be tried in a colonial court of justice, otherwise they would be judged here, which would increase the expense of law proceedings beyond all bounds.

Are you aware of any instance in which a colonial legislature has refused to sanction a patent?—I am not; nor am I aware of many instances in which it has been applied for: the objection to having a patent for England and the Colonies, without an act of the colonial legislature, is, that all law proceedings being necessarily in this country, the expense of bringing over witnesses would be enormous, for an invention which is exclusively practised in the colonies. Those inventions are not very numerous, and hence it is not common to apply for such acts. In cases of inventions which are expected to be chiefly employed in this country and only occasionally in the colonies, the inventor might not think it worth while to apply for an act of the colonial legislature. The only instance which has come to my knowledge, is a recent patent to Mr. Hague, for expelling the molasses from sugar; he explained to me, that if law proceedings on such a patent right were limited to suing infringers in our courts in this country, it would amount to a prohibition altogether; hence he applied for an act of the colonial legislature, at the same time with his patent for this country. It may be stated on that ground, that an invention which is entirely for the service of the colonies, will require an act of colonial legislature, in addition to the patent, to make it available, but they are very few; I suppose, with the exception of that invention, and half a dozen others that have never come into use, there will be no such cases found; there being but few manufactures that are exclusively practised in the colonies. I suppose they would require a separate act for each colony which has a legislative assembly.

What time does it take to obtain a patent?—It is said to be six weeks; but whether they have ever been obtained in six weeks or not, I cannot say; they are certainly now two months upon the average, and that is frequently extended to a much longer period.

During the time between making the application and sealing the patent, has the applicant any security for his invention?—No security whatever; there is even an increased necessity for secrecy beyond that which existed before his application, because his application has called attention to his procedure, and declared what is the object of his pursuit. A man who has proceeded with some freedom in his experiments, and in private trials of machinery, before he applies for his patent, is always obliged to shut up his models, and desist altogether, until he obtains a patent; for, by his application, he calls the attention of all rivals to his proceedings, and any disclosure of his invention made before his patent is sealed, (however treacherously obtained,) would be fatal to his patent. It is a common prac-

tice of manufacturers, if they begin an invention solely for their own use, without any thought of a patent, when they have obtained such a prospect of advantageous result as to see that a patent would be desirable, they destroy all the models, and every vestige of them, and even send away the workmen who made them on some distant embassy, to avoid any chance of the secret being called forth by the competition that exists among rival traders as soon as one makes an application for a patent. That is a very great inconvenience, and valuable time is lost to the public as well as to inventors.

Then there are no legal precautions that a man can take against that chance of losing his patent right?—None whatever; and it frequently happens that patents are delayed very long in their progress through the offices, so as to occasion a very great grievance. I had an instance of that recently; I prepared the title for an application for a patent on the 23d of June last, and I am certain that the first proceeding for a patent was taken by the attorney within a day or two of that date: but the patent was not obtained till the 31st of January, 1829: what made this peculiarly inconvenient was, that the inventor had made a trial of his invention before he thought of taking out a patent at all, and before he applied to me. I advised him to keep it a profound secret from the instant that he made an application for a patent, and I told him that it would be from six weeks to two months that he would be obliged to remain in secrecy and consequent inaction; but it proved to be more than seven months. In the mean time, another person conceived the same idea, and opposed the grant of that patent before the Attorney-General, when the progress of the patent was far advanced; that opposition was not made till the 8th of December; and I believe that the invention, upon which the opposition was founded, did not exist at the time when the patent ought to have been granted, if there had been no delay.

Did this extraordinary delay arise out of any peculiar circumstances affecting that patent?—I am not aware of the circumstances, but there were no unusual circumstances attending the invention; it is probable that the king's health might have affected it, as in all cases I know that when the king is indisposed, the patents are delayed at the stage when his signature is required. In this case, the opposition grew up in the meantime, and the applicant was obliged to answer it at considerable expense, and at the risk of his patent being refused, and further delay was occasioned.

The longer the delay between his application and the patent being granted, the greater the risk of opposition?—Of course, the greater the risk of opposition and of discovery; the above inventor, Mr. Parker, is a lieutenant in the navy, and at that time had no occupation whatever, but he was waiting in total inaction till he could bring his invention forward. It is a self-acting drag, to be applied to travelling carriages, and he had so well digested his plan, that he was ready, the very day after the patent was sealed, to begin to work with great vigour, and the thing was applied to a carriage, and tried in a short time after his patent was sealed; but if he had

done so, in the time between applying for and obtaining it, he would have been subject to the loss of his patent, for the plan could not be concealed when it was taken out to try it on the public road.

Do you not word the title obscurely, in order to avoid directing public attention to the subject?—Yes, but there is a danger in being too obscure, because then a court of justice may afterwards hold that it is an invalid patent, for want of coincidence between its title and the specification. It is one of the most metaphysical problems that I know, to prepare a title to a patent: it generally takes me two or three days to make up my mind about the wording of a title; not to be so clear as to call the attention of rivals, and enable them to discover the subject, and not so obscure as to incur the danger that a court of justice may afterwards rule, that it is an imperfect definition or title of the invention described in the specification.

Do you see any remedy for that inconvenience?—The remedy is obvious: to make the right of the patentee secure from the time he makes his application; on condition of his lodging a paper of the heads of his invention—a statement of the principle on which he founds his invention; that is the case in Spain. Another obvious remedy is, that the final specification and description of the means of executing the invention, should be engrossed in the patent itself, so that the title of the patent, instead of being the only means of reference between the two documents, should become a mere indorsement, and a matter of no importance: the latter is done in France. As our practice is now, if the Judges cannot find in the title of the patent what has been called a general index of the specification, the whole patent is set aside. The difficulty of making a correct general index to a work which is not yet composed, must be very great.

(To be continued.)

DESCRIPTIVE ACCOUNT OF ALL THE

PATENTS ENROLLED BETWEEN 20TH SEPTEMBER AND 20TH OCTOBER, 1829.

Particularising the Offices in which the Specifications may be inspected, with the Dates of Enrolment.

LEVER.—To John Nicholls, of Pershall, Staffordshire, gentleman, a patent for "certain improvements in the lever, and in the application of its power," was granted on the 25th of July last, and the specification was deposited in the Enrolment Office on the 25th of September, 1829.

The plan which we have adopted of giving an account of all the patents which are enrolled compels us to give, occasionally, descriptions which are unprofitable to us, inasmuch as they do not enhance the interest of our work, useless to the Public, for no one can benefit from inventions founded on erroneous princi-

ples, and injurious to the patentees, by exposing their ignorance and folly. Of such a character is Mr. Nicholl's patented improvements "in the lever, and the application of its power," which he states to consist in applying weights to the opposite sides or ends of a lever suspended at the centre, (the centre of gravity being below the point of suspension), so, as when acted upon, to produce a vibratory or oscillating motion, which may be applied like any other force or power to the moving of machinery or other useful purposes, where force is required.

This lever may be made of cast-iron, or any other suitable material, and may be of any given form or dimensions, as to its length, breadth, or thickness. At certain given points, near each end he attaches weights, or he so forms the arms of the lever as to act themselves as weights. These weights are placed in such a position as to balance each other, and at a given distance below the line of the axis of motion, and, by the alternate elevation and depression of each end in succession, he obtains a vibratory action, by which he states an accession of power is obtained. He says that he finds, by experiment, that when the lever is 5¾ inches from the axis of suspension to the centre of the weights, that the line of the centres of the said weights should be about three-fourths of an inch below the centre of the axis of suspension, making an angle with the centre of about 16 degrees. He also finds that it is beneficial for the improved lever to have an elevation above the axis, of about two and three-quarter inches, making an angle with the centre of about 25 degrees. The suspended weights which he has applied in these applications are about 21lbs. each, and the vibratory action of the lever about 36 vibrations, or double strokes, per minute. These lines of construction and given dimensions, and the statement of weight, as applied in practice, he lays down and recommends as general data for the proportional construction of all apparatuses on a larger scale, and which he considers as best adapted to obtain the most effective power from the application of his said improved lever. But he does not confine himself to any particular form of construction, or to these proportions; for, if a greater speed is required, he alters the weights, and adapts the construction of the improved lever and its machinery to the object to which it is intended to be applied. The power originated by the vibratory action of the improved lever and weights, he says, may also be advantageously applied to working pumps, and many other useful purposes, which will be obvious to every practical mechanist.

He claims as his invention, the application of the vibratory motion of suspended weights, acting on opposite sides or ends of a lever, having a common axis to the production or application of force as a moving power as herein described.

He likewise claims as his invention, the described application of the improved lever, and of the mechanical power originating from the vibratory motion of suspended weights, acting as aforesaid under any other similar form of construction, by which the same can be manufactured, produced, and applied; but he does not claim the wheels, cranks, or axis, or any other mechanical apparatus in common use, as any part of his invention, except in connection with the construction of the "improved lever, and the application of its power."

We will not insult our readers by offering any formal refutation of the absurdities advanced by this patentee; for there is not one amongst them who is not well aware that no accession of power is obtainable from any vibratory action, whatever be the form of the vibrating matter.

We are told, that "the schoolmaster is abroad;" but it appears he has not yet reached the gentleman of Staffordshire. Nor has there been established in the neighbourhood of Pershall any Mechanics' Institution, otherwise, the patentee might have attended a course of lectures at an expense of less than two-pence each, which would have been the means of preventing him from expending upwards of *one hundred pounds* on a useless patent.

Button Manufacturer.—To William Church, of Bordsley Green, Aston, Warwickshire, a patent for "certain improvements in buttons, and in the machinery or apparatus for manufacturing the same, was granted on the 26th of March, and the specification was enrolled in the Rolls Chapel Office, on the 25th September, 1829.

This is a patent for an improvement on a plan of making and covering buttons patented by Mr. Needham. It consists of an arrangement of apparatus, by which the slips of metal intended to constitute the bodies of the buttons, are received by a kind of forceps, denominated by the patentee, hands, and conveyed to a punch-box, where disks of the required size are punched out through the medium of connecting-rods acted upon by canes attached to the main shaft of the machine; which may be put in motion by steam, or any other first mover. A similar combination of apparatus is employed in punching the disks for the neck

pieces, and the disks of the valentia, or other substance with which the button is to be covered; these disks are then severally deposited in carrier-wheels, which bring them together at a part of the machine where the valentia is gathered over the larger disk, by being pressed into a recess whose edges approach, and bring together the edges of the cover, which is secured in its place by the attachment of the neck piece.

The metallic slips of which the disks are made, are conveyed by the forceps or hands of the machine, through slits in the punch-boxes, and the valentia, or other covering material, is unwound from a roller on which it is kept attached to the machine.

In this machine there are many very ingenious contrivances, well calculated for effecting the purposes for which they are intended, but their details could scarcely be made intelligible without numerous drawings, which the general interest of the subject is not sufficient to justify our introducing minute details as must accompany the extensive drawings.

Calico-Printing Rollers.—To Benjamin Cook, of Birmingham, brass-founder, a patent for "an improved method of making rollers, or cylinders of copper, and other metals, or a mixture of metals, for printing of calicoes, silks, cloths, and other articles," was granted on the 23rd of April, and the specification enrolled in the Petty Box Office, on the 30th September last.

The objects of this patent are to facilitate the change of the rollers which are used to give the impression in calico-printing. Several rollers, with different designs, are made to fit upon the same axis, and are put in motion by the same train of wheel-work. This has been usually effected by making the axis conical, and to fit into conical holes in the rollers; but instead of this plan, Mr. Cook proposes to make the axis elliptical, or eccentric, with respect to the pivots on which it turns: the patentee states, that the elliptical, or eccentric axis may be turned in a lathe, with an oval, or eccentric chuck, which having prepared, he takes a piece of copper, or other metal, of a size somewhat larger than the intended roller, and drills a hole longitudinally through its centre, of sufficient capacity to admit the elliptical axis, and to make them fit each other accurately, he passes them together through a succession of holes in a draw-plate, using the axis as a mandril, an operation similar to the process of tube-drawing. The surface of the roller is then to be turned very truly, and the design

or pattern is to be engraved upon it in the usual manner. Any number of rollers may thus be made to fit accurately the same mandril or axis, and the pattern changed as often as may be required, without subjecting any other parts of the machinery to alteration.

The patentee does not state what advantages he expects to gain by the substitution of the elliptical, for the conical axis. Indeed, from the facility with which circular parts can be made to fit each other, and fix together, it would appear this patent process of manufacturing rollers is inferior to the method at present in use.

SHIPS' PINTLES.—To John Lihou, of Guernsey, but now residing at the Naval Club-House, in Bond Street, London, Commander in the Royal Navy, a patent for "an improved method of constructing ships' pintles for hanging the rudder," was granted on the 14th of April, and the specification was enrolled in the Petty Bag Office on the 10th of October, 1829.

This patentee has in view a plan of constructing the pintles of ships' rudders, by which they may be more easily detached and replaced by new ones, in cases of injury; and also to facilitate the steering of the ship, by lessening the friction of the pintles. In order to render easy the removal of a damaged pintle, and the substitution of a new one, he proposes to make the pendant pintles separate from the projecting pieces, by which they are attached to the rudder. The holes in the rudder braces are to be made square, or some other convenient form, differing from the circular, to prevent them from turning in the holes, into which they are to be fixed firmly by keys, screws, or by rivetting; and a number of new pintles are to be kept always on board, and ready to fix into the places of such as may be broken, or otherwise damaged.

The diminution of friction he proposes to effect by causing the rudder to rest upon the extremities of the pintles, instead of the broad portions of the braces from which they project, as has been the case heretofore, and thus diminishing considerably the quantity of rubbing surface attendant on the motion of the helm. Into the lower parts of the pintle sockets, which are attached to the sternpost of the vessel, are fixed pieces of metal, whose upper surfaces may be left flat, made circular, conical, or into any other form which might be found convenient in manufacture; but a flat-bottomed socket, with a spherical pintle end resting upon it, has the preference, both in point of simplicity and freedom from friction, while its strength is not inferior to that of any other form.

The advantage of a spherical end resting upon a flat surface, is, that the parts sustaining the greatest quantity of pressure are subjected to the smallest quantity of motion—a circumstance well deserving the attention of the machinist.

The benefits arising from this simple method of constructing pintles are so obvious, that we can scarcely believe that they ever could have been made in any other way; but Mr. Lihou, who is a Commander in the Royal Navy, is much more likely to be acquainted with the fact than we are, and the sum which he has risked in securing the advantages of his invention sufficiently demonstrate his views of the subject.

PATENT STEAM CARRIAGE

Of Sir James C. Anderson, Bart., and W. H. James, Esq., Vauxhall.

Having been professionally engaged, from time to time, in making drawings for the above-mentioned house, frequent opportunities have been afforded us of witnessing their experiments in locomotion, which are chiefly made within their own premises, round a circle of 160 feet in diameter; and it affords us sincere pleasure to acquaint our readers, that every thing which is essential towards *perfectly safe and rapid travelling* by the power of steam is on the eve of accomplishment. In some trips recently made on the Croydon road, the speed of the carriage averaged full twelve miles per hour; and although arrangements have been made for increasing the speed, to twenty or more miles, it is not the wish of the proprietors to go beyond twelve, considering *that* velocity to be as great as is consistent with personal safety on the thronged public roads. (It would be an easy matter to run twenty or thirty miles per hour on the common road, *or even one hundred miles per hour on a good railway*, by the introduction of a blast to the fuel; a blowing machine is, however, not only unnecessary, but very injurious * in its effects upon the metal, of which the boiler is composed.) The total weight of the carriage, including the water and fuel, is not more than 26 cwt. The supply of fuel carried is sufficient for 50 miles; and of water, for about 20 miles.

At Plate VIII, we have given a sketch of the external appearance of this carriage, and it was our intention to have given some views of the internal arrangements, which we find it necessary to defer, as some improvements have been recently made in these respects.

The boiler is formed entirely of tubes, three quarters of an inch in diameter, made of the best iron, and proved by a steam and water pressure to be capable of sustaining a force of 4000 lbs. upon every inch, which is more than twenty times the strength required, as the

* We might add, *destructive*, since, there can be no question, that it was the blast upon Messrs. Braithwaite and Ericsson's boiler, which caused it to give way, and let the water into the furnace.

steam is suffered to escape, when the pressure exceeds 200lbs. The length of the tubes of the boiler is, altogether, 430 feet 5 inches.

The working cylinders are four in number, which act together, or separately, upon cranks, at right angles,* and therefore may justly be regarded as four complete steam-engines, occupying a space between the hind-wheels of *only one foot in breadth, by two feet in height.* The compactness and simplicity to which the steam-engine has been reduced in this carriage is truly extraordinary.

Although each of these engines may be considered as of two-horses power, we would undertake to put one in each of our coat pockets. The speed of the engines varies from 200 to 400 strokes per minute, and the steam is worked expansively. The power is applied independently to both of the hind-wheels, whereby the friction is rendered constant upon the road, whether the carriage be running along straight lines, or making every variety of curve—an arrangement which is also of the utmost utility in ascending hills. The steering apparatus is one of great power and effect, and gives the driver infinitely more control over the movements of the vehicle than can possibly be obtained by the most skilful jehu with horses. We have seen the carriage repeatedly make turns of less than ten feet radius; and as the driver can at pleasure take off the power instantaneously, and apply a drag without any exertion, the superior safety of a carriage propelled by steam must be evident, especially when it is considered that the bursting of the boiler is rendered absolutely IMPOSSIBLE in this carriage, there being no steam chambers of more than one inch in diameter, which, were it possible to burst, would not effect the slightest injury.

On account of the great length to which some articles have been extended in this Number, we are precluded from entering further at present into this interesting subject.

LEATHER CLOTH.

TO THE EDITOR.

Sir,—In your last journal, you give a description of Mr. Hall's Pannus-Corium, or Leather-Cloth, an invention worthy a place in your pages. But it is with regret that I notice your giving credence to an assertion of your "friend," the *cobler*, viz. "that when the shoes begin to wear out, they cannot be repaired." Now, I take upon myself to say, they can be mended *better* and even *neater* than leather; for, in the first place, they can be repaired by putting a piece on the fracture, as is usually the case with leather; and in the next place, the surface of the material being a soft composition, it can be spread by means of any thing hard, so as completely to hide the sewing.

I have worn them myself, and given them a fair trial; the case

* The principle of these arrangements were patented by Mr. James in March, 1824, and will be found fully described in the "Register of Arts," 4th volume.

and comfort I have experienced in the use of them is beyond description, and feel fully assured, they have, as Mr. Hall says, no drawing influence whatever on the feet.

My reason for contradicting the assertion of the *cobler*, arises from a desire to give a plain and correct statement of the fact, *that the pannus-corium boots and shoes can be as easily and neatly repaired as leather*.

Your obedient servant,

Oct. 20th, 1829. H. S. J.

IMPROVED SHIP'S RUDDER.

We understand that Captain Hendry, R. N., has invented an ingenious piece of iron-work, which he terms a heel-brace, and which is applicable to the lower part of ships' rudders, in case the lower pintles are broken by the ship's grounding, or from any other casualty. This instrument is previously fitted to the lower part of the ship, that, when required, it may be better suspended by two guys from the after-part, and kept in its place by two guys leading forward. It has a hinge in it, in lieu of the pintles, and is secured to the rudder by two or three bolts, with fore-locks. To provide for the whole of the pintles going, he proposes that ships should also be furnished with a hoop or cap, to embrace the head of the rudder, into which the tiller is to be shipped, which will render the rudder as effectually serviceable as ever. Captain Hendry also suggests a new mode of making a temporary rudder, to which the above heel-brace and clasp-hoop are to be attached, the whole of which can be put together in a short time, and without the use of a forge.

LIST OF NEW PATENTS SEALED.

PROPELLING MACHINERY.—To J. Moore, of Broad Wier, Bristol, for certain new or improved machinery for propelling carriages, ships, or other floating bodies, &c.—Dated 30th Sept. 1829. Specification to be enrolled in Six months.

CAT-HEAD STOPPERS.—To W. Rodger, of Norfolk Street, Strand, for certain improvements in the construction of cat-head stoppers.—30th Sept. 1829. Six months.

STEAM ENGINES.—T. Banks, of Patricroft, within Barton-upon-Irwell, Lancaster, for improvements in steam engines.—30th September, 1829. Six months.

COTTON.—To P. Descroizilles, of Fenchurch Street, for certain improvements in apparatus for removing the down from cotton and certain other fabrics, by singeing.—7th October, 1829. Six months.

PROPELLING MACHINERY.—To W. Church, of Heywood House, Birmingham, Esq. for certain improvements in machines for propelling vessels, &c.—15th October, 1829. Six months.

KNIVES.—To W. Church, Esq. Heywood House, Birmingham, for improvements in sharpening knives and other edge tools.—15th October, 1829. Six months.

DESCRIPTIVE ACCOUNT OF ALL THE

PATENTS ENROLLED BETWEEN 20TH OCTOBER AND 20TH NOVEMBER, 1829.

Particularizing the Offices in which the Specifications may be inspected, with the Dates of Enrolment.

MAST FIDS.—To William Prior, of Albany Road, Camberwell, a patent for "certain improvements in the construction and combination of fids for securing, supporting, and striking top-masts and top-gallant-masts of ships and other vessels," was granted on the 11th of April, and the specification was enrolled in the Rolls Chapel Office on the 10th of October, 1829. *

This is patent for a nautical invention, of considerable merit, and well deserving the attention of ship-builders. The usual method of securing the top and top-gallant-masts of ships, is, to introduce, through a mortice in the mast to be supported, a pin, denominated a fid, which rests upon the tressel-trees or cross-beams, which are attached to the principal or lower-mast, and thus supports the upper-mast. The chief objection to this fid, is, the difficulty of removing it without loss of time, when a sudden squall or storm renders it necessary to strike or take down the top-mast, while it is subjected to great strain from the force of the wind. To remedy this inconvenience, Sir Robert Seppings, of the Navy Board, took out a patent, in 1826, for improvements in the construction of fids, which consist in the introduction of screws, to secure the top or top-gallant-mast in its place when raised to the proper elevation. This plan may be ingenious, but it has a degree of complexity about it which renders very questionable the propriety of introducing it amongst a class of men so little accustomed to refinement in mechanism as the generality of our British tars are. In the early part of 1827, Benjamin Rotch, Esq., a barrister, equally eminent for his scientific knowledge, and his acquaintance with the laws and practice of Courts respecting patent rights, took out a patent for a new fid, or diagonal prop, for transferring perpendicular to lateral pressure. A description of this invention, which possesses very considerable merit, will be found in the New Series of the *Register of Arts*, vol. 1. page 280. This fid, however, like the others, if made secure, cannot be easily disengaged when the weight of the top and top-gallant-masts, with their accompanying rigging, is resting

* Want of sufficient space prevented this from being included in our last number.

upon it, while their pressure is increased by the force of a heavy gale, which is frequently the case when the masts have to be struck.

To obviate these objections, Mr. Prior proposes, in his specification, two plans, which are represented by figures 1 and 2, Plate VII, in our last number. The same letters refer to similar parts in both plans.

a, represents the lower, or supporting mast, to which trussel-trees are to be secured in the usual way.

b b, the top, or mast to be supported, which is represented with one half removed to show the mortice *e*, into which the wedge-shaped piece, *d d*, fig. 1, and cam *d*, fig. 2, the one resting upon, and the other attached to the trussel-trees, *c c c c*, are to be projected to support the mast. *f* is a cam in figure 1, which, when turned round by raising the lever *g g*, into the position represented by fig. 1, prevents the piece from slipping back, by the circular portion of the one fitting into the circular portion of the piece *d*, and prevent the descent of the mast: but when it is necessary to lower, or strike the top-mast, the lever *g* is to be depressed, as represented at fig. 2, which can be done in a moment with the greatest facility, notwithstanding any weight or pressure which it may at the time be sustaining. The piece, *d*, being thus liberated, is pressed out by the top-mast in its descent. Though this method may be considered good, and superior to its predecessors, yet it is far inferior to the second, in which the cam *f* is arranged to act upon the cam *d*, and project it into the mortice *e*, when the lever is elevated as represented by the dotted lines, which are also made to show the position of both cams when the mast is supported.

It will be perceived that, by this arrangement, a very considerable power is obtained for bringing the top, or top-gallant-mast up to its final altitude, or, as it is technically termed, *bousing it home*, as well as for supporting it when in that position, while the support can be instantly removed by the application of a very little force.

Condensation of Gases.—To James Wright, of Newcastle-upon-Tyne, soap-maker, a patent for "improvements in condensing the gas or gases produced by the decomposition of the muriate of soda, and certain other substances, which improvements may be applied to other purposes," was granted on the 28th of April, and the specification was deposited in the Enrolment Office on the 26th of October, 1829.

This patent is principally intended to apply to the condensation of gases evolved in the manufacture of soap, so as to render that process less offensive, that it may be carried on in towns. When a ley of potash, rendered caustic by lime, is employed in the saponification of the oily or fatty substances, a soft potash soap results, which is rendered hard by a double decomposition, frequently effected by the addition of common salt. The muriatic acid combines and constitutes with the potash muriate of potash, which dissolves in water, and is usually drawn off in the spent ley, while the soda enters into combination with the fatty substances and constitutes the soap, which becomes hard by drying. To decompose the gases given off in this process, Mr. Wright empties a kind of tank, built of brick, and lined on the bottom and to about a foot up the sides, with lead or other water-tight material. Into the upper part of this tank are inserted pipes, communicating with the boilers or vessels in which the muriate of soda is decomposed. So that the gases which are disengaged in these boilers placed around, are collected in the tank, and decomposed by lime-water, which is thrown into the upper part of it through the perforated end of a hose by the means of a force-pump which receives its supply from the lower part, and thus the same lime-water may be repeatedly used until it becomes saturated. From this vessel the gas, partly purified, is conveyed through a pipe into a cylinder, revolving in a horizontal position. Attached to the circumference of this cylinder, are fans or leaves proceeding nearly to the centre, or line of axis. The cylinder is supplied with a quantity of dry lime in a finely divided state, which is carried up by the leaves as the cylinder revolves, and in falling down to the bottom again, it is brought continually into contact with the gas as it passes through the cylinder. By employing two or more of these cylinders, which are put in motion by the same power which actuates the force pump, the gas is so completely deprived of acid that a vegetable-coloured test paper does not undergo any change by being held over the flue by which the gas is discharged, after passing through the tank and revolving cylinders.

The value of the muriate of lime made by this process will be nearly equal to the expense incurred by it, therefore its advantages, which are very considerable, are obtainable at little or no cost to the soap manufacturer.

The patentee proposed to apply the same method to the purification of the coal gas, for the purposes of illumination. The sulphurated hydrogen coming in contact with the lime, is deprived of its sulphur, and the carburetted, which gives the greatest quantity of

light, with the least offensive smell, is conveyed through the pipes to the burners in the usual manner.

TINNED PLATES.—To Thomas Morgan, of Tipton, Staffordshire, manufacturer of tin plate, a patent for "a new method of manufacturing, or preparing iron plate, or black plates for tinning, was granted on the 9th of September last, and the specification was deposited in the Enrolment Office on the 30th of October.

After the iron has been prepared by cutting into appropriate sizes, and rolling out into thin plates, it is necessary to make its surface perfectly clean, which has been hitherto effected by the processes called scaling and pickling. Now, as much time as well as iron is wasted in scaling, Mr. Morgan proposes to plunge the iron into cold water while it is discharged hot from the flutting rollers, by which means the scales are removed without loss of time or metal.

The plates are then to be pickled and cleaned in the usual manner, and then immersed in the melted tin, by which the black iron plates get a complete coating of tin, and are hence called tinned, or, more generally, though not so properly, tin plates.

To render obvious the advantages of this invention, it is only necessary to compare it with the old method of scaling the black plates, which consists in doubling together a number of the plates, and then heating them to a bright red, or nearly a white heat in a kind of oven, resting on their edges with their folded parts upwards. When they have attained the requisite degree of heat, they are removed from the oven on a piece of strong wire, and placed in the same position upon the floor, when a large quantity of the scales fall off; and, to clear off the remainder, they are subjected to the following operation: they are again made flat, and several of them held together by the corners, and knocked repeatedly with considerable violence against a block or anvil, till the scales are all removed. Now this process is evidently very tedious, laborious, wasteful, and expensive, compared with Mr. Morgan's method of scaling the plates by letting them drop into cold water as they pass hot from the flatting rollers.

SUGAR REFINING.—John Davis, of Lemon Street, London, a patent for "certain improvements in the condenser used with the said patentee's apparatus for boiling sugar in vacuo, for which a patent was granted to him on the 29th day of March, 1828, entitled an improvement in boiling or evaporating sugar or other liquids," was obtained on the 25th of April, and the specification was deposited in the Enrolment Office on the 30th of October last.

Mr. Davis obtained a patent in March, 1828, as stated above, for a method of boiling sugar in vacuo, by means of a Torricellian vacuum which he obtained, by having his sugar-pans connected with a condenser upwards of thirty-three feet above the level of the place where the water from it was discharged; and as the pressure of the atmosphere does not at any time sustain a column of water exceeding that elevation, the apparatus being first filled with water, which being permitted to escape at the lower extremity the upper will be left vacuous. But finding this great height very inconvenient in numerous instances, he devised and patented the following method of obtaining a vacuum by the condensation of steam from the boiling vessels. Near the sugar-pan, which is a close vessel, and in connexion with it, is placed the condenser, a vessel of considerable capacity, consisting of double sides, &c., with a small space between them to be kept full of water; and near to the condenser, but somewhat above its level, is placed another vessel also made air-tight. This vessel is filled with water, the air being permitted to escape at the top, which is then closed by a stop-cock. In the interior of this vessel is placed a revolving agitator, consisting of several perforated vanes, the use of which is to get the water by agitation entirely freed from air, which is permitted to escape at the stop-cock as often as any is separated from the water. A pipe connects the top of the sugar-pan with the condenser, and also with this water-vessel, which is likewise connected by another pipe with the lower part of the condenser. Now, when steam is generated in the boiler, it fills the condenser, and then a portion of it is permitted to pass on to the water-vessel, and forces a sufficient quantity of the water into the lower part of the condenser, to convert all the steam with which it is filled into water, and thus a vacuum is obtained, which will continue till all the water is changed from the water-vessel to the condenser; and the capacity of these vessels must be such, that the change shall not be completed till the operation of boiling the sugar with which the pan was supplied is finished.

The various connecting pipes are furnished with stop-cocks to break off the connexion as occasion may require; and both the condenser and water-vessel are furnished with glass guages connected with them at top and bottom, showing at any time the quantity of water they severally contained.

Gun-Locks.—To George Henry Manton, of Dover Street, Piccadilly, gun-maker, a patent for an "improvement in the construction of locks in all kinds of fowling-pieces and fire-arms," was

granted on the 2d of September, and the specification was deposited in the Enrolment Office on the 31st of October last.

The intention of this patent is to lessen the recoil of the piece when fired by a percussion lock, which is effected by making a vent-hole for the escape of a portion of the elastic gaseous matter generated by the sudden inflammation of the gunpowder. The vent-hole is left closed by a cover attached to the end of a small lever, and retained upon the hole by a spring, until the descent of the percussion cock in the act of firing acts upon the other end of the lever, and removes the cover. The various little screws, pins, and pivots connected with this contrivance are very minutely detailed, but not claimed in the specification.

It is not a little surprising that a man of Mr. Manton's experience in the manufacture of fowling-pieces should not have hit upon either a more simple or more efficacious method of obviating the recoil of a fowling-piece. If, for instance, he had diminished the charge of powder, he would have lessened the recoil, and if he had made his vent-hole equal in diameter to the bore of the barrel, he would have effectually prevented it. We are aware that by the first of these he would lessen the force of the shot, but he will do the same by the method which he has patented; and by the second he would destroy the force entirely, but this he would do by any method which would effectually prevent the recoil.

Embroidering.—To Henry Bock, of Ludgate Hill, London, a patent for "improvements in machinery and apparatus for embroidering cloths, stuffs, and other fabrics," was granted on the 2d of May, and the specification was deposited in the Enrolment Office on the 31st of October last.

The intention of this invention, which is said to have been communicated to the patentee by a foreigner residing abroad, is to effect by machinery a process hitherto only performed by hand. The apparatus consists, first, of a moveable cloth frame, on which the cloth to be embroidered is stretched, having a roller at each side, the one containing the cloth to be ornamented, and the other that portion which has been ornamented, while the piece between the rollers is subjected to the operation. And, secondly, a needle frame, to which are attached pliers or needle-holders, in number corresponding with the number of flowers or other ornaments intended to be made at one time. This frame is made double, as it has on each side of the cloth alternately to receive and put in the needles, which are made pointed at each end, with an eye in the middle. The threads are drawn

tight by being passed over plush surfaces, which permit them to move with facility in one direction, but draws them tight when the frame is moved in the other. Motion is given to the cloth frame by a series of levers, on the principle of the well-known tracing-machine called a pentagraph, to which is connected a handle with a tracer. A pattern flower or other ornament is provided, of a size considerably larger than those to be worked upon the cloth, so that the position of each stitch may be easily perceived by the attendant. The point of the tracer being placed upon any stitch on the pattern brings the cloth frame, which is accurately balanced by a counterpoise weight forward upon all the needles, each of which performs the same stitch on the cloth that the tracer touches, though of considerably smaller dimensions.

This arrangement is applied to ornaments made with sewing-needles, but the same pentagraph principle is equally applicable to ornamenting cloth with the tambour needles. This invention displays much originality, and contains many appropriate and ingenious combinations; but we suspect that the taste for embroidery has so far subsided, at least in this country, as to render the patent nearly useless.

Spinning.—To George William Lee, of Bagnio Court, London, merchant, a patent for "certain improvements in the machinery for spinning cotton and other fibrous substances," was granted on the 2d of May, and the specification was deposited in the Enrolment Office on the 2d of November last.

This invention, which was the communication of a foreigner residing abroad, consists in the substitution for the flyer usually employed to convey the thread round the bobbin, a small hook, which is made to travel round the bobbin, either by being attached to a circular arc moveable in a groove made in a hoop or hollow cylinder containing the bobbin, or it is attached to the hollow cylinder, which is itself made to turn round the bobbin, and thus wind the thread upon it. When this is done, which is the method principally recommended by the patentee, the hollow cylinder is to be supported upon a plate of metal through which the axis of the bobbins pass, and it is put in motion by a band, which causes it to press against two anti-friction rollers placed on the side of it next the drum employed to communicate motion to the bobbins and hooks. The bobbin frame is made to traverse forwards and backwards in the usual manner, so as to distribute evenly the thread or yarn upon the bobbins, and the hollow cylinders are made large enough to admit the greatest quantity required to be put upon them at one time.

The advantages proposed to be gained by this invention are greater speed with less friction, and greater uniformity of motion, and, consequently, less wearing of the moving parts; but we question much whether these are sufficient to compensate for the greater complication of parts, and the consequent greater liability to derangement. The first mentioned we consider objectionable, as the motion of a slip of metal moving in a groove must be subject to considerable friction and some irregularity, while the second has too much matter in motion for the operation to be performed, and too many rubbing parts for the motion to be affected with little expense of moving power.

Propelling.—To James Dutton, junior, of Wotton-under-Edge, Gloucestershire, clothier, a patent for "certain improvements in propelling ships, boats, and other vessels or floating bodies, by steam or other power," was granted on the 19th of May, and the specification was deposited in the Rolls Chapel Office on the 19th of November last.

Mr. Dutton proposes to employ, on each side of the vessel to be propelled, several hollow cylindrical plungers, placed in recesses in a sloping direction, making, with the surface of the water before them, an angle of about twenty-two and a half degrees, and, with the surface of the water behind them, an angle of about a hundred and fifty-seven and a half. These plungers move in recesses made in the side of the vessel, furnished on their upper sides with anti-friction collars, against which the plungers are pressed by their being hollow, and consequently lighter than water. Each of the plungers is attached to the end of a piston rod, which passes through a small steam cylinder, provided with a piston to be acted upon by steam, which is admitted in succession into the several cylinders, by the alternate opening and shutting of an admission, and an escape valve connected with each cylinder. After the steam has been admitted into a cylinder, and has forced out the plunger, by its action on the piston, it is permitted to escape, when the plunger, being lighter than water, will be again elevated to its first position.

Of all the numerous propelling schemes which have recently come under our observation, this is the most absurd; for the utmost speed which can be put upon steam pistons would not move the vessel by its direct action upon the water at the rate of three miles per hour; and, taking into account the loss of effect by the oblique action of the plungers, and their re-action upon the water in returning, the speed would be considerably under that rate. Indeed, if it were greater, all the plungers would become useless, as the difference be-

tween their specific gravity and that of water, acting at the oblique angle above stated, would not be equal to the resistance of the water consequent on the motion of the vessel.

THE "SAFETY" STEAM-BOAT,"

By Sir JAMES ANDERSON, Bart., and W. H. JAMES, Esq., Vauxhall.

IN our last Number we gave a brief account of the steam-carriage belonging to the abovementioned firm; since the publication of which, a description of the same machine has been given in the "Mechanics' Magazine," wherein the Editor, Mr. Robertson, in commenting upon our remarks, relative to the powerful effects of the boiler in the experiments we witnessed, observes, that it has yet to be shewn that those effects can be kept up for an hour or more together. At the present time, Mr. Robertson cannot have the satisfaction of personally witnessing the permanency of those effects in the steam *carriage*, as that machine is now taken to pieces for the purpose of making some alterations to the valves of the steam and exit passages; and, from the progress already made in the re-construction, I doubt not he will be afforded, in the course of a week or two, an opportunity of convincing himself of the correctness of our views on the subject. Without, however, awaiting the completion of the alterations mentioned, he may at any time see an engine of the same description on the premises of Messrs. Anderson and James, which has been constantly at work, twelve hours per day, ever since the manufactory was established. The effectiveness of these engines has, however, been recently put to a much severer test, in another application, in which there can be no deception; namely, in the propulsion of a passage-boat, which is destined to ply immediately on the Thames, between Kingston and London. Having, ourselves, very lately (the 14th of November) made a trip to Richmond and back in the vessel, we are enabled to give some account of it, and, to congratulate our readers and the public, that the time has now arrived, when, in addition to the other great advantages of travelling by steam-vessels, all danger from explosion of the boilers will be ANNIHILATED. Indeed, this has been Mr. James's chief aim and object, and there results from these means of generating steam of great elastic force, with perfect safety, other advantages, of a highly important nature.

It has, we believe, been hitherto found an insuperable difficulty to construct steam-boats of so small a size as that we are about to describe (which measures less than 15 tons), on account of the great weight of the ordinary machinery used for propulsion, which would alone sink such a vessel to the gunwhales, and prevent her carrying any cargo: that is to say, a low pressure engine of Bolton and Watts's, or of any other reputable manufacturers, of the same power as that actually employed in the "Safety," would be equal to the whole tonnage of the vessel; but the engines, boilers, easings, flue, gear, paddles, &c. (including all the machinery), is under three tons in the "Safety," which leaves 12 tons for burthen. If we now take into consideration the circumstance that the weight of steam-engines

increase nearly in the ratio of their power, and suppose two vessels, so much larger than the one mentioned, as to require engines of ten times its power, for propulsion; the weight of Anderson and James's engines in one of the vessels would be only 30 tons, while the weight of the low-pressure machinery of the same power in the other vessel would be 150 tons; the latter vessel would, in consequence, be pressed down into the water five times deeper than the other, and thereby increase the resistance of the water to the vessel's motion in nearly the same proportion; and if the vessels were to be burthened so as to render their depth of immersion equal, Anderson and James's vessel would then be able to take 120 tons more of cargo. Should a greater cargo not be required, but an increased velocity of motion in preference, then an engine of five times the power of the other might be employed in the same vessel, to attain that end: the results, therefore, are, either a greatly increased velocity, owing to the reduced weight of the machinery, or the carrying of a much greater cargo at the same velocity.

These are, however, not all the advantages that are consequent upon the employment of very dense steam, when it can be used with perfect safety, as in the present apparatus. The consumption of coals is *less than half* that of condensing engines of the same power, which, as our readers well know, is an item of no trifling consequence in the expenses of working steam-engines, especially those used in navigation. In the making of long voyages, wherein the quantity of fuel necessary is very great, and forms, sometimes, nearly the whole of the burthen of the vessel, it would be of signal importance to be able, by the reduction of the weight of the coal to one-half, to give her so much more space and tonnage for passengers or cargo.

An objection has been started to the employment of tubular boilers in sea-going vessels, on account of the liability of the tubes becoming choaked with depositions of salt; in reply to which, we would observe, that, were tubes of greater calibre employed, that would lessen their liability to become so considerably; but there is an obvious preventive to any such effect at all—that of using fresh water, and condensing the steam, which seems to us very easy of accomplishment, in various ways, without causing any sensible retardation of the vessel's motion. Mr. James has, however, a very excellent mode of effecting this object, by a peculiar mode of distillation, which we are not at present permitted to explain.

There is yet another circumstance occurs to us respecting high-pressure engines of this kind, which is, that their first cost is considerably less, amounting, we believe, to not more than half that of the ordinary engines, and from their superior simplicity the repairs are less expensive. From the great danger attending the use of high-pressure engines with boilers of the common construction, they are almost wholly disused in this country, notwithstanding the many advantages they confer in other respects. All these advantages, but in a greater degree, are, however, now obtainable by the use of James's patent high-pressure boiler, which it is demonstrable is infinitely safer than the best constructed low pressure boiler; so that, upon the whole, there is, in addition to the perfect safety, greatly re-

duced expense, an augmentation of useful space or tonnage, and increased velocity. These are properties of the greatest value taken distinctly, but when united, as in the present case, they appear calculated to extend very materially the benefits of steam navigation.

Having extended our introductory observations to so great a length, our limited space will compel us to be rather brief in our description of the boat itself, of which we have given in Plate IX. a plan, by fig. 1, and a vertical section, longitudinally, by fig. 2.

The hull of the boat, as shown by the scale, is only 50 feet long, and the greatest breadth 9 feet 3 inches outside measurement at the line of the gunwhales; the inside depth is only 3 feet 4 inches, and to form the cabins, the sides are raised so as to have a height of 6 feet in the cabins, or under the deck. A represents the after-cabin; F the fore-cabin; B the boiler; C the chimney; E the engines: P P the paddle-wheels; D D dressing-closets; G G the gangway, which surrounds the cabins and hull; H the head; and S the stern of the vessel.

The boilers are four in number, constructed on the principle of those described by us in our ninety-fifth number (first series), under Mr. James's patent. Instead, however, of each of the boilers consisting of a double series of tubes, as there delineated, they have only a single series; and instead of their being circular, they are compressed at the sides into an elliptical figure, in order to reduce the area of the space they would otherwise require. These boilers with their flues are enclosed in a double casing (packed with a non-conducting substance), which measures 5 feet by 6, and about 4 feet high. The tubes, of which the boilers are made, are of the very best malleable iron, a quarter of an inch in thickness, and have an internal diameter of 1⅛ inch. They have been proved to sustain a pressure of about two tons upon the inch, and the safety valves being loaded to only about 200 lbs. upon the inch, the working pressure upon the boilers is only about a twenty-second part of their *proved* strength, which probably is very far short of their *actual* strength. The bursting of such tubes is therefore rendered almost impossible, and *should* that possible occurrence take place, the effect would be perfectly innocuous, of which we have had demonstrative evidence, by the defects which occasionally manifest themselves when proving the soundness and strength of the boilers.*

The engines consists of two vibrating cylinders, enclosed in a strong frame, the upper and lower plates of which are connected by six massive cast-iron pillars, the frame measuring only 2 feet 6 nches square, and about 3 feet high. The pistons of the cylinders are Barton's patent metallic, 5 inches in diameter, and have a stroke of 18 inches. Each of the engines made ninety double strokes per

* Sometimes owing to a minute defect imperceptible to the eye, arising either from the metal being rolled in too cold a state, or from imperfect welding, a fissure is opened by the immense pressure to which the tubes are subjected, from whence the steam rushes with a stunning kind of scream, which, so far from alarming any person acquainted with the matter, it is common for the workmen to place their hands on the strong jet of steam which issues forth to feel the force of the current, while they examine and mark the place with chalk, to ascertain where the repairs are needed.

minute, with undeviating regularity during our voyage to Richmond and back, making 270 feet per minute for the speed of the pistons, which, being operated upon by steam of about 100 lbs. per inch, gives 16½ horse-power, (calculating each horse-power at 33.000 lbs. lifted one foot high per minute.) The paddle-wheels are, at their full extent, 7 feet wide in diameter, and have 8 floats, 3 feet 4 inches wide, and 1 foot deep. These revolve with only half the velocity of the crank to the engines, by the intervention of two to ones purgear.

Our trip before mentioned to Richmond and back (which was the first trial to a distance), was performed in four hours and five minutes; the total distance was twenty-seven miles, nineteen of which was against the tide. The vessel left Vauxhall Bridge at two in the afternoon, and returned the same evening before seven, fifty-five minutes out of which time was occupied in stopping at the Eel-Pie House at Richmond, and in landing some passengers in the course of the voyage. The speed was as fast, under existing circumstanees, as any of the Richmond boats; and we have no sort of doubt that when the paddles and engines, (which appear to us to misapply full half the power of the steam,) shall have been altered, that the velocity of the boat will be considerably accelerated. The defects consisted in the paddles being too deeply immersed, and on the loss of a great deal of power from the stiff working of the engines, to which some valves of a novel and very ingenious construction have been applied, experimentally, to the steam and exit passages, but unsuccessfully, on account of the excessive friction they create.

STEAM-BOAT PROPELLING APPARATUS.

By Mr. King Williams.

A model of this very ingenious invention we saw some few weeks ago at the National Repository, and we have since been favoured with a drawing of it by Mr. King Williams, a copy of which is given at figs. 5, 6, and 7, Plate X.

The object of this invention, take nearly all its precursors in the same line, is to provide a remedy for the defects of the common wheel, which consist (as our readers have heard a hundred times before) of the unfavourable position of the paddles for propelling, at the time of their dipping into, and rising out of, the water.

a, fig. 1, is the axis of the wheel; *b b b b*, arms radiating therefrom; *c d*, *c d*, *c d*, *c d*, the paddles with their arms or rods, the latter *d* being inflexibly fixed to the former *c*, and forming, with respect to each other. the obtuse angles represented, these have a joint, *e e e e*, to turn upon at the extremity of each arm; *f* is the water line; *g* is a crank fixed centrally to the axis of the wheel, but so as not to revolve with it; the position of this crank is alterable or adjustable at pleasure, by means of a set screw, which causes the paddles, through the medium of the connecting rods *i i i i*, to take such an angle with the water-line as may be deemed most desirable for propelling. The rods *i*, are, however, connected to a revolving collar (showing separately at fig. 3.) on the crank, which allows of their free rotary motion, while it draws the paddles uniformly into the positions shown in the drawing, when the arm of the crank is set in 2 horizontal position. The dotted lines show the position which the paddles assume in the intermediate parts of their revolution, or the relative position they would take if there were eight paddles attached to the wheel. Fig. 2 shews the plan of a paddle and its connecting rod separately, the letters thereon having reference to similar parts in fig. 1.

Fig. 1, 2, 3, & 4, on Plate X. represent the Lamp described at p. 71, part xxvii.

MESSRS. BRAITHWAITE AND ERICSSON'S STEAM-ENGINE.

BY THE EDITOR.

SIR,—On reading in the *Morning Herald*, of Tuesday last, an extract from the "Register of Arts," containing an account of a new steam-carriage patented by Sir James C. Anderson, Bart. and W. H. James, Esq. I was not a little astonished to find it stated in the form of a foot-note to the article, that "there can be no question it was the blast upon Messrs. Braithwaite and Ericsson's boiler which caused it to give way, and let water into the furnace; meaning, at the late competition on the Liverpool and Manchester Railway. I concluded of course, that Mr. Hebert, the editor of the "Register," could not possibly have seen the number of the "Mechanics' Magazine," in which it was clearly shown there was no giving way of the *boiler* at all, in the case of "The Novelty," but a yielding of part of the furnace-flue, in consequence of its being accidentally exposed to a dry heat of high temperature, and that "the blast" had nothing whatever to do with the accident, which would have been equally certain to happen had there been no blast in the case. Your readers may judge, however, what my surprise was, when on sending for the number of the "Register" itself from which the above extract was taken, I found three-fourths of it filled with quotations from your interesting account of the late competition and the competing engines, including among these quotations the very explanation which ought to have prevented the egregions misrepresentation transferred from the pages of the "Register" to the *Herald*. The correctness of that explanation is not once disputed by the editor of the "Register;" nor could he, with any regard to truth, have impugned it in the slightest degree. Yet in the teeth of his unquestioned and unquestionable explanation, he has elsewhere the hardihood to affirm, "there *can be no question* it was the blast," &c.! "question!" Mr. Hebert knew well that a question had been raised on the subject, but completely set at rest by the explanation given in your work, and copied from it into most of the journals of the day.

The motives which have led Mr. Hebert to hazard so gross a perversion of the truth are easily to be traced. Sir James Anderson and Mr. James are patentees of a steam engine in which the tubular plan is carried to such an excess, that the tubes of one of two horse power extend the moderate length of 430 feet!!! Mr. Hebert is, as he states, "professionally engaged" for these gentlemen; and it is the obvious interest of all parties concerned in, or connected with that engine to make it appear to the public, that tubular boilers are the best of all possible boilers, and every other plan of generating steam more or less inefficacious and dangerous.

It is not accordingly the *blast* alone which Mr. Hebert finds fault with in the construction of "The Novelty," and endeavours by misrepresentation to bring into disrepute. "The great steam-chamber A" is also with him a source of prodigious alarm, although such chambers are common to all high-pressure engines, as well as "The Novelty;" and the one in "The Novelty" is one of the *smallest* ever known, being at least three-fourths less than the steam-chamber

of "The Rocket" and "Sans Pareil." The gentleman even calls for legislative interference to protect the public from the "catastrophes" which he asserts "are sure to happen" from the use of "great steam-chambers" like the little great one of "The Novelty;" that is, in plainer language, for an Act of Parliament to prevent all persons from using any other than the four hundred and thirty feet generating tubes of Sir James Anderson, James, Hebert, and Co.!!

Whatever private interests Mr. Hebert may have to serve, he ought, as a man of science, and the editor of a scientific journal, to be ashamed of such palpable subserviency. Years have gone by since it was left to ignorance and prejudice to wage war against the employment of high-pressure steam-engines. Mr. Hebert must know well, there is no danger connected with them which cannot be effectually guarded against; and he has acumen enough to perceive (if he would but exert it conscientiously) that the blast, which he abuses so much, does in fact lessen that danger, instead of augmenting it; since, in proportion to the quickness with which steam can be generated, must the necessity of having a large store in reserve be diminished.

I might say much more in illustration of Mr. Hebert's candour and impartiality; but having vindicated myself and partner, and our engine, from his illiberal aspersions, and pointed out the source of these to a discerning public, I have no desire to trespass farther on your pages.

I remain, Sir, your obedient servant,

1, *Bath Place, Fitzroy Square,* JOHN BRAITHWAITE.
Nov. 4, 1829.

TO THE EDITOR.

SIR,—It appears by your last number that Mr. Braithwaite, true to the name and calling of his Saxon ancestors, who were *Brathewihts* (which means, in our refined language, Blowers-up), has been attempting to blow *me* up—not, (thank Heaven) with his "great steam-chamber A," for that is an awful SEPARATERY indeed, but with a goose-quill! The explosion of such small tubes I however regard with no more apprehension than boy's firework called a *cracker*, which has, by the bye, been most aptly compared by the editor of "The London Journal of Arts" to Mr. James's patent boiler: for, were it possible to burst by the pressure of steam any of the tubes in that boiler, the effect would be as harmless as that produced by the explosion of the distinct portions of the *craeker;* but taking collectively the steam in all the tubes of the former, and all the powder in the envelops of the latter, their explosion would then be dangerous. It is, however, useless labour to attempt to show by reasoning, what every reader of "The Mechanics' Magazine" fully understands; namely, that the comparative safety of steam-magazines is in proportion to their diminished capacity, all other circumstances relating to them being the same. Indeed, it is clear that Mr. Braithwaite is of the same opinion himself, however angry it makes him that other people should think so too. Alluding to me, he says,

"the great steam-chamber A is with him a source of prodigious alarm, although such chambers are common to ALL *high-pressure engines, as well as 'The Novelty;' and the one in 'The Novelty' is one of the* SMALLEST *ever known, being at least three-fourths less than the steam-chambers of 'The Rocket' and Sans Pareil."*

As to the construction of "The Rocket," I was not previously acquainted with it; but it appears now, from the statement of Mr. Braithwaite, to be of the *Congreve kind:* and with respect to "The Sans Pareil," it is devoutly to be hoped that it will ever retain a right to its present proud title. From the preceding extract, it is evident that Mr. Braithwaite takes credit to himself for having a *smaller* steam-chamber in "The Novelty" than is possessed by "*The Rocket,*" or *The Sans Pareil;*" he goes further, and observes, that his steam-chamber is the SMALLEST ever known, meaning of course that it is so much better, or safer, for that reason. Now the gentleman who makes this assertion, knows very well that the steam-chambers in James's boiler are only about a five-hundredth part of the area, for he endeavours to throw ridicule upon them from that very circumstance; and notwithstanding, they are in consequence, according to his own argument, 500 times better and safer than his own. All this inconsistency proceeds from a person who charges me with "misrepresentation"—"gross perversion of the truth"—illiberal aspersions—"interested motives"—"palpable subserviency"—"egregious misrepresentation," &c. &c. without, however, condescending to prove one of them; and for no other reason that I can discover, than his predilection for *blowing-up*.

Considering how he would himself act under similar circumstances, Mr. Braithwaite accuses me of interested motives, because, forsooth, I had been engaged (as I mentioned myself) in making drawings for Messrs. Anderson and James; but it unfortunately happens for that sagacious conclusion, that I have a direct pecuniary interest in the locomotive carriage of a rival concern. This does not, however, prevent me from repeating, that Mr. James's boiler is the only one I have hitherto seen that is adapted to locomotion by steam power, whether in carriages or boats, on account of its PERFECT SAFETY, there being no magazines of steam which are more than about an inch in diameter; and from repeating my opinion, that Messrs. Braithwaite and Ericsson's is, on the contrary, as DANGEROUS as any that have hitherto fallen under my observation. I have not given those opinions unaccompanied by reasons for them; and no man in his senses can say that I have mis-stated facts to the prejudice of Mr. Braithwaite, as I have given the account of those facts, word for word, from "The Mechanics' Magazine," which Mr. Braithwaite states is the only correct account.

I have said that the *boiler* gave way, which Mr. Braithwaite calls a "gross perversion of the truth," and asserts that there was no giving way of the *boiler* at all in the case of "The Novelty," but a *yielding* of a part of the *furnace-flue,* in consequence of its being "ACCIDENTALLY EXPOSED TO A DRY HEAT OF HIGH TEMPERATURE." Now, suppose Mr. Braithwaite, having the propensity of his forefathers full upon him, were to march straight into his kitchen, and com-

mence to *blow-up* Betty's fire, on which was placed a kettle with very little water in it; the water being quickly evaporated, and the kettle exposed to a "dry heat of high temperature," the metal would yield to the blast, and a hole would soon be made through the bottom or side: on perceiving which, Betty would naturally exclaim, "Lord, sir, you have blown a hole through my kettle!" Would Mr. Braithwaite then say to her, "Slut, you are guilty of a *gross perversion of the truth*, and have *interested motives* for saying so; there was no *giving way* of the kettle at all, but merely a *yielding* of part of the *furnace-flue*, in consequence of its being *accidentally* exposed to a dry heat of high temperature!" Poor Betty, astounded, would probably think with the "most noble Festus," and say, if she durst, "Much larning doth make thee mad."

For my part, Mr. Editor, I see no difference between the two cases; in all boilers the water is on one side of the metal of which they are formed, and the furnace, or furnace-flue on the other. Had you not favoured your readers with a section of "The Novelty's" boiler, it might have been conjectured that the *yielding* was in part of the furnace-flue beyond the boiler; but then we should not have been able to account for the circumstance of "The Novelty" being put *hors de combat*. A reference to the section however shows, and your explanation states, that the failure was at or near the flange *a*, at which place the fiercest heat from the blasted furnace impinges; and had it not been that the pumps continued out of order, so as to prevent the water from rising, a very serious *blow-up* would, without doubt, have been the result.

Mr. Braithwaite, however, asserts, that "the blast lessens the danger, instead of augmenting it; since, in proportion to the quickness with which steam can be generated, must the necessity of having a large store in reserve be diminished." With respect to the effect of a blast upon metal, oxidation will proceed in proportion to the quantity of oxygen thus thrown upon it; and every blacksmith well knows that the metal is thereby quickly "*burnt away*:" at all events, the tenacity of the metal is so rapidly diminished, and to an extent so uncertain, there can be *no safety* in the application of a blast to high-pressure boilers with *large steam-chambers*, like "The Novelty." Mr. Braithwaite is, nevertheless, right when he states, that the more rapidly steam can be generated, the necessity of having a large store is diminished.

This is, however, a plain acknowledgment on his part of the disadvantages and danger of vessels of large capacity, and, consequently, of the great superiority of Mr. James's boiler, the merits of which Mr. Braithwaite endeavours to depreciate. All that I wish to impress upon the public mind is, the excessive danger attending the placing of a great store of high-pressure steam in one vessel, instead of very numerous small ones: in short, I prefer the effect of the boy's crackers to that of a barrel of gunpowder.

With respect, I remain, Sir, your obedient servant,

20, *Paternoster Row*, L. HEBERT.
Nov. 10, 1829.

AN ACCOUNT OF THE PRINCIPAL RAILWAYS IN THE KINGDOM.

(Chiefly extracted from Tredgold's work on the subject.)

THE Hetton railway is one of the principal ones; it is in length, seven miles five-eighths; and on a train of from 13 to 17 waggons is impelled by a locomotive high pressure engine *. The train of 17 waggons, when loaded with their usual weight of coals, is about 64 tons. The total variation of level from the pit to the staiths is 812 feet, of which, a part is accomplished by inclined planes, and the rest by regular descent of 1 in 335. The rails are of the edge kind, the extreme length of each is 3ft. 11 inches, and the breadth of the upper surface 2¼ inches: they join with a scarf joint. The carriages are propelled by the locomotive-engine, at the velocity of from three and half to four miles per hour. Similar railways are established in the neighbourhood of Whitehaven, in Cumberland. From these the use of railways has gradually spread to various places, Yorkshire, Derbyshire, Wales, and Scotland.

The Surrey rail-road commences on the south side of the banks of the Thames, near Wandsworth, in Surrey, and proceeds in a south-easterly direction, about nine miles and a half to Croydon, and from thence in a more southerly direction, eight miles to Merstham, making a total of eighteen miles. The rails consist of a flat plate, four inches wide, and nearly an inch thick, with a ledge to guide the wheels, three inches deep, by half an inch thick. The waggons weigh about a ton, and are five feet wide, eight feet long, and two feet deep, and are allowed to carry not exceeding three tons and a quarter. The wheels are of cast-iron, an inch and half in breadth at the rim, and thirty-two inches diameter: they revolve on conical axles, two inches three eighths diameter after the shoulder, and an inch and half at the linch-pin. According to Mr. Palmer's experiments, 1 lb. will draw 60lbs. on a level part of the rails, at the velocity of two miles and half per hour; or, one horse of average strength will draw a total weight of 900lb. †

The coal works near Leeds and Wakefield are connected with the neighbouring canals by numerous railways; and the town of Leeds is supplied with coal from the Middleton coal-works, by a rail-road, on which the waggons are impelled by steam-carriages. These carriages differ from those used in the neighbourhood of Newcastle and Sunderland; for, instead of depending upon the friction of the engine carriage wheels for reaction, the rails of the railway have cogs, or projecting teeth, into which toothed wheels, driven by the engine, works as a pinion works in a rack. This species of steam-carriage was applied by Mr. Blenkinsopp in 1811. ‡

* See a full description of this engine, with an engraving, in vol. iv. first series, p. 445.

† Rigister of Arts, vol. 1. first series.

‡ A full description, with an engraving, is given in vol. iv, first series, p. 441.

The Deusbury and Birstal railway is to convey coals from the coal-works in Birstal parish to the vessels in the Calder and Hebble Navigation. Its extent is about three miles, and it was finished in 1805.

The Ashby-de-la-Zouch canal, which was opened in 1805, is terminated by a railway of three miles three-eighths in length, extending to the Ticknall lime-works in Derbyshire; another railway of five miles to Measham collieries; and one of six miles and a half to the Cloudshill lime-works.

The Derby canal has several railways that branch from it, viz. to Horseley collieries, to Smithey houses near Derby, four miles, and to Smalley mills, one mile and a half.

Railways also branch from the Cromford and Erewash canals; and the Charnwood Forest canal is connected with the river Soar Navigation by a railway two miles and a half in length, with a rise of 185 feet, called the Charnwood Forest railway.

The Chapel Milton to Loads Knowl railway, branches from the Peak Forest canal at Chapel Milton in Derbyshire to Loads Knowl lime-quarries in the Peake, a length of about six miles, with an inclined plane 515 yards long, and 204 feet fall. It was conducted by Mr. Benjamin Outram, engineer.

The Lancaster canal railway extends from Clayton Green, across the valley of the Ribble, to the top of its opposite bank, three miles and a quarter. The communication between the parts of the canal is effected by means of this railway. which has an inclined plane on each side of the valley, and the fall is 222 feet.

From the river Wye, near Mitchell Dean, a railway is laid through the forest of Dean to Lydney on the Severn, with a branch by Colford to Monmouth. And in the same neighbourhood, another railway extends from the Severn, five miles, to the collieries in the forest.

The peculiar advantages of railways for great changes of level, is no where more fully exemplified than in the inclined planes of the Shropshire canal.

The Shropshire canal having to pass through a district where the changes of level were abrupt and considerable, it was thought expedient to adopt inclined planes for conveying the boats to different levels. The first inclined plane is 350 yards in length, and 207 feet in perpendicular height, with a strong double railroad upon it, to admit boats loaded with five tons, and their carriages. The second plane is 600 yards in length, and 126 feet in height, and the third 320 yards in length, with 120 feet fall. The whole were designed by Mr. William Reynolds, who constructed a plane of the same kind in 1788, with a fall of 78 feet, for eight ton boats.

In Cornwall, a rail-road, five miles in length, has been constructed, from the harbour of Portreth to the mines near Redruth.

And an extensive railway from Stockton by Darlington to the

collieries on the south-west side of the county of Durham, is now completed. It proceeds from Stockton in a westerly direction, and about three miles and a half from thence, a branch to the south, of two miles, leads off to Yarm; the main line passes close to Darlington, and about four miles beyond Darlington, a branch to the south, of nearly two miles, leads to Pierce Bridge. About five miles further on the line, the Black Boy branch leads off in a north-easterly direction to the Black Boy and Coundon collieries; the extent of this branch is upwards of five miles. The main line continues past Evenwood to near the Norwood collieries, and returns in a north-easterly direction to the Etherly and Witton Park collieries. The total extent of the main line is about thirty-two miles. It is formed with edge-rails.

In Wales, the rail-roads communicating between the iron-works and coal-mines, and branching from the canals and rivers to the principal mining districts, are very numerous, and have proved very beneficial undertakings both to the constructors and the public. The main rail-roads are joined by many smaller private ones, commonly called tram-roads, which give a great facility for traffic, in a rugged country like it, where the common roads are very bad. In 1791, there was scarcely a single railway in South Wales; and in 1811, the complete rail-roads connected with canals, collieries, &c. in Monmouthshire, Glamorganshire, and Caermarthanshire, amounted to nearly one hundred and fifty miles in length, exclusive of underground ones, of which one company in Merthyr Tidvil possessed about thirty miles. The quantity is daily on the increase, and we shall only have occasion to notice the principal ones.

In consequence of the upper part of the Cardiff, or Glamorganshire canal, being frequently in want of water, the Cardiff and Merthyr railway or tram-road was formed parallel to it, for a distance of about nine miles, chiefly for the iron-works of Plymouth, Pendarran, and Dowlais.

The Act of Parliament for this tram-road was obtained in 1794, (35th Geo. III.), by Messrs. Hompray, Hill, and Co.; and it appears to have been constructed under the first Act ever granted for this species of road. The width of the land allowed to be purchased was seven yards, and the whole length of the line is about twenty-six miles and three quarters. It is one of those cases where the ruggedness of the country renders any communication difficult, but there are certainly fewer difficulties to contend with in railways than canals, in such districts.

It was on this tram-road that a trial was made of Trevithick's high pressure engine, on the 21st of February, 1804, for drawing the carriages. The same species of engine has been more recently applied, with better success, by Blenkinsop and others.

The Aberdare canal, which branches from the Cardiff canal, is connected with the Neath canal by railways, the communication being completed by an immense inclined plane, up which the waggons are drawn by a high pressure engine.

The Sirhoway rail-road, or tram-road, commences from the Monmouth canal, at Pillgwelly, and passing through Tredegar Park, up the Ebwy river, at Risca, crosses that river by a bridge of sixteen arches; and following afterwards the course of the river Sirhoway, by Tredegar and Sirhoway iron-works, to Trevill lime-works, a total distance of about twenty-eight miles; and it is accompanied through all its extent by a good turnpike-road. From the Sirhoway railway there are branches to several collieries, one to the Romney iron-works, and others in two places to the Monmouthshire canal. One horse draws about ten tons down this railway, and returns with the empty carriages. The Act was obtained the 42 Geo. III.

The Brinore rail-way also leads from it, and is contiuued over the Black Mountain to the vale of the Uske at Brecon, and from hence to Haye on the Wye. By means of this communication, the price of coals in the upper parts of the counties of Hereford and Radnor has been much reduced.

The Blaen-Avon railway also leads to the Monmouthshire canal, its length is five miles and a half, and it rises 610 feet in that distance, to the Blaen-Avon furnace.

The Caermarthenshire rail-road commences from the dock or harbour of Llanelly, and extends fifteen miles, through a productive coal country, to the lime-works at Llanbedie; and from the eastern side branch rail-ways to the extensive coal-works of General Waide. Its general objects are the export of coals, iron, lead, &c. The Act was obtained the 42 of Geo. III.

From Mr. Palmer's experiments it appears that one pound will draw only fifty-nine pounds on a level part of this railway.*

The Oyster-mouth railway proceeds from Swansea, seven miles along the coast, to the village of Oyster-mouth; it is intended chiefly for the carriage of lime-stone. Act 44th Geo. III.

Several other railways communicate with the Swansea canal from the coal-works in its neighbourhood.

The Abergavenny rail-way proceeds from the Brecknock canal, and passes by a Bridge over the Uske to Abergavenny. From the same canal there is a railway branch to Uske and to Haye, and various others to coal and iron-works; and at the iron-works near Pontypool there are some lofty inclined planes.

The Ruabon Brook railway commences from an extensive basin at Pontcysylte, on the north bank of the river Dee; it is a double railway, and proeeeds with a gentle ascent past Mr. Hazledine's iron-works, and through among numerous collieries to Ruabon Brook, a distance of three miles.

Of the Welsh railways. we shall only further notice the railway for conveying slates from the Penrhyn slate quarries, because it differs from the ordinary railways. The rest of the railways in Wales have flat or tram-rails, almost without exception.

Penrhyn railway, from the Penrhyn slate quarries in Caernar-

* Description of a Railway on a New Principle, p. 29, 2d. edit.

vonshire to Port Penrhyn, extends a distance of six miles and a quarter, and is divided into five stages; it has three eighths of an inch fall in one yard, that is one part in ninety-six, and it has three inclined planes. This railway was begun in October, 1800, and finished in July, 1801. It has oval-formed edge-rails of cast iron, four feet and a half long, and two feet apart. Two horses draw twenty-four waggons one stage, six times per day, and carry 24 tons each journey, or 144 tons per day. The wheels of the waggons are of cast iron, fourteen inches diameter, and weigh thirty-five pounds.* According to Mr. Palmer's experiments, it requires one pound to draw eighty-seven pounds on the Penrhyn railway, when the rails are level; † while on the edge-rails of Newcastle, one pound will draw one hundred and seventy-six pounds.; this difference arises from the smallness of the wheels used on the Penrhyn railway. But, imperfect as it is, it has been of great value to the proprietors of the slate quarries, by saving an immense expense in horse labour. The carriages are very low, and apparently convenient for conveying slates short distances; in fact, they are rather trams than waggons.

LAW OF PATENTS.

(Continued from page 121.)

Mr. Davies Gilbert, a member of the Committee, in reply to the questions put to him, said, that he considered the object of the present law of patents is, to excite ingenuity—to encourage persons to exert their talents for the public benefit.

That the invention of a principle is a much greater atchievement, and much more likely to produce great public benefits than the invention of any mode of applying a principle already known; consequently that they should be secured to their inventors for a certain number of years, assuming that sure practical mode of applying them to useful purposes, made a part of the invention, and be included in the specification; and the inventor should not lose the benefit of his monopoly in consequence of another, or even a better, mode of application being discovered.

That it would be expedient and beneficial to appoint a commission, composed of scientific men and lawyers, to examine a specification before it was enrolled, to ensure the patentee from its being afterwards impugned; but he disapproved of giving authority to such decisions as would preclude persons from recovering afterwards in a court of law. He thought that the rule of law which vitiates the whole of a patent, in consequence of a partial defect, to be inexpedient, unless fraud were proved. He was of opinion that a tribunal of scientific men were more competent to decide upon the validity of a patent than a court of law; but he did not see how such a tribunal

* Repertory of Arts, vol iii. p. 285, and vol. xix. p. 16. New Series.
† Description of a Railway on a New principle, p. 29.

could be formed, unless it was done through the medium of a reference—that it should be lawful for a person to take out a patent for an invention communicated to him by a British subject, provided the communication were voluntary,—thought it might be advantageous to allow individuals to secure a monopoly of less than fourteen years, or paying diminished fees; and, that it might be advisable to make different regulations for the different sorts of inventions, separating, for instance, the mechanical from the chemical discoveries.

Mr. Charles Few, being called in and examined, said, in reply to the various interrogatories put to him, that he entirely concurred in the efficiency and propriety of a commission, instead of the present mode, which is little better than a farce. He would allow every person that chose to take the risk and expense to apply for a patent, and have that patent, in case no caveat was entered against him. In the case of a caveat, he would have it come before the Attorney-General, or a barrister, to be appointed, who should be at the head of a commission, which might easily be formed of scientific and practical men, and would not have the validity of a patent tried by a Jury, as they frequently can know nothing about what they so try: did not think, with Mr. Aikin, that the expense of a patent should be small; he thought *it should be a pretty heavy sum.* The inventor should be protected from the moment he made his affidavit and petitioned for his patent; would give six months to deposit specification, and give to the commissioners the power of allowing the patentee to amend his specification, in case they found it erroneous. *The fees payable at the Privy Seal Office and the other offices might as well be paid at once! Would have the fees upon patents* INCREASED! He would have it such a sum as would *pay* the commissioners; there was *no* reason why they should not be paid by the patentee, who ought to pay the expense of the commission by which he was protected! *

"If the fees were *much higher,* Mr. Few said, parties that are now taking out patents for little speculative things that do not answer, would not take them out; they act something like the dog in the manger, *they prevent the public from benefitting* by the invention or improvements on it for fourteen years, and yet do not benefit themselves." In this Mr. Few is somewhat inconsistent; for he says, in a former part of his evidence, that improvements made subsequently to the obtaining of a patent, should be allowed (according to the French practice) to be appended to the specification, so as to run concurrently with the patent, as that would be *good for the public,* and good for the patentees."

Mr. William Newton being called in and examined, coincided very nearly with Mr. John Farey on the several points upon which the latter gentleman was examined, we shall therefore pass over those parts of Mr. Newton's evidence, and proceed to the account which he gave the Committee respecting the process of taking out patents

* Were the suggestions of Mr. Few to be acted upon, it is devoutly to be hoped that he would not participate in the spoil of the poor patentees; but it is impossible to carry such iniquitous and foolish measures into effect.—Ed.

in France, which we extract from the London Journal of Arts, as the parliamentary report appears therein to have been revised.

Are you acquainted with the French law of patents?—I am tolerably well acquainted with the progress of patents in France.

Will you state what is the course of proceeding in France, on applying for a patent?—The course of proceeding in France is to deposit the specification with the petition and other papers called the *Procès Verbal*, which immediately upon depositing you take a certificate for; you then pay one-half of the government charges, which vary according to the length of time for which you solicit your patent; you immediately take the certificate and get it enrolled, for which you pay a small sum, and that gives your patent precedency of all others that shall follow, even if another for the same subject came in the course of an hour; and that is the reason why it has been deemed expedient sometimes to deposit a preliminary specification which shall not contain all the particulars that might be ultimately called for.

How soon is the party obliged to put in his ultimate specification in France?—It is possible that they would grant the patent upon that preliminary specification, if he did not take care to have a better one inserted; but if the consultive board, upon opening those papers, which are all sealed till they come before them, find that the specification is not satisfactory, they call for further information, and then a more perfect specification is delivered.

When you say if the specification is not satisfactory, do you mean, if it is not sufficient to describe the invention?—Exactly.

Is there any examination, by scientific persons, of the specification, with a view of ascertaining whether it gives a correct description of the invention?—There is an examination before scientific persons, who constitute what are called The Consultive Board, and that examination has several objects, perhaps not the primary one of observing whether the specification is full and complete; but one object is to ascertain whether the invention is original so far as they know. If it has been published in any printed book, they will refuse the grant, and on refusing the grant will *return the fees* paid.

Does not the other point come under their consideration?—It does certainly; but I should suppose where there may be many patents, that point would be very likely to be slighted; because sometimes I have myself enrolled a specification that has contained a very long account of a very elaborate machine, and a great many drawings; and it would be very difficult for gentlemen to sit over those drawings and consider all the bearings of the different pieces of the mechanism connected with it; and therefore, I think, they would take it for granted that it is a correct description; it appears to be clearly described, and accordingly take it to be a good specification.

Are patents in France ever set aside after they have been granted, on the ground that the description is not sufficient?—I am not aware, but I should think it could not be so; because in France, a patent is open to have all improvements added, and all amendments made during the whole period, upon paying a small fee; and perhaps a year

or two after, when an inventor has made a sufficient number of experiments, he applies for a patent of *Perfectionment*, as they call it, and then he enrols his amended specification, and whatever the consultive board approves of, as falling within the range of the first claim, and entirely belonging to it, they grant as part of the original patent, on paying a trifling fee.

Do you think that would be an improvement in the practice in England?—I think it would be highly desirable in England: because I have known many instances in which the patentee, not being able to pursue his experiments and construct his machinery before the enrolment of his specification, has ultimately found that he was deficient in parts, and has been obliged to go through the whole process of obtaining patents for the three kingdoms again.

Would you enable him, by application to the Patent Office, to add his new discovery to his former patent?—Certainly, I would.

And would you have it concurrent with the existing patent?—Yes; I will state an instance in point. A gentleman in Birmingham has lately invented a very ingenious machine, for the manufacture of silk buttons, composed, of course, of many movements and parts; and one part of the process was to introduce small discs through a little opening like the opening through which you would push a letter into a box; he has now, half a year after the enrolment of his specification, discovered a mode of introducing slips of metal, which he can cut off in this machine without the difficulty of feeding in the discs, by hand, for which he has now been obliged to take another patent, which is not yet specified; and he is paying all the English fees again. It happened that he was enabled to put in an account of this invention into his Scotch patent; and his Irish patent, from the tediousness of the process of obtaining it, has not yet been granted, and therefore he will be enabled te incorporate both in one there.

With respect to the commission for the examination of patents in France, do you know how the board is constituted?—I believe, by appointment of the government, but that I am not positive of; I know that Monsieur Dupin, who is a well-known philosopher, is a member of the board, because I have corresponded with him upon some points connected with the practice of the board.

Do you know whether the decisions of that board have been generally satisfactory to parties applying for patents, as well as the public?—I believe, they put the most liberal construction upon things, and they grant the patent statedly at the risk of the applicant, not holding themselves answerable for his representation.

Have you heard that any complaints have been made of partiality?—No; I think they would not be partial; there are too many of them to suppose that there could be any connivance that would be unhandsome; and I am not aware of there having been any complaints that were worth considering.

Do you consider that a board of that kind would be beneficial in this country?—I think it would, if composed of gentlemen who are not actually manufacturers or operative engineers; but who have been, and who are well acquainted with scientific matters.

Are there any French patents set aside on account of insufficiency in the description of the invention?—I should apprehend very few, in consequence of the ease with which a defect of that sort might be amended.

Supposing an insufficient description is given purposely, with a view of misleading the public, how is it likely to be amended?—Then I conceive that the parties could only maintain that as the matter of their invention which they have described. If they have described a great many other things which are of no use, or that are not new, that does not as in England affect the validity of the patent. If there are twenty things claimed in the patent, and nineteen of them should turn out to be old, the twentieth still stands its ground without overturning the patent, which I think would be exceedingly desirable here.

Is it not the practice in some instances in France that the specification should be concealed?—I am not positive upon that point; it is an expensive thing to gain access to a specification; but I have seen specifications through my agent, who has taken me to the office.

What is the expense of inspecting a specification?—Perhaps two or three pounds.

But you are not aware of any case in which the specification of a patent has been entirely concealed from the public?—I think I have heard of such things, but I am not competent to speak to the fact.

Do you think it is a common practice?—No, I should think not, as a number of the specifications of French inventions are published by the Society at Paris for the Encouragement of Arts.

Then the moment a man has made an application for a patent, his invention is secured to him?—He secures whatever the board chooses ultimately to grant to him from that moment.

Is there any precautionary step that a person can take in France before his views are completely matured, in order to secure priority?—Nothing whatever, but the preliminary specification which I have described.

Then he must, in fact, have gone through probably, in most cases, a course of experiments before he can put in a specification?—He must absolutely have accomplished something that looks like an invention on paper.

Do you think it would be expedient to mend the law in this country so as to make it similar to that of France in that respect?—I think it would.

Is it not generally understood that the French specifications are concealed?—I do not know what may be the common understanding; I know it is not the fact. I believe the specifications are not shewn but through a petition, and that causes the thing to be expensive.

Is the petition in most cases granted as of course?—I believe it is of course to a native, but not to a foreigner. I gained access to the specification of an invention which I was anxious to see, because the invention had been stolen from a printing machine which I sent over, and applied to another purpose, (a power loom,) and therefore

I was anxious to see it in order that I might stop the same thing happening here in England, which I did when a patent was applied for here, for the improved power loom.

In the case of a patent being infringed where the specification is concealed, how is the satisfactory evidence given to the court as to what the original invention was?—I presume that the patentee produces his patent which has the copy of his specification appended to it regularly sealed and signed by the proper authorities.

In that case, does his specification at once become public?—I suppose it does.

In France, how many commissioners are there?—I do not know; there are, I think, ten or more.

Is it an answer to an objection against a patent in France, that the process has been examined by those Commissioners, and that the patent has been granted accordingly?—The Commission sit for the purpose of examining the petition and specification, and they report upon it; which report, if favourable, causes the patent to be issued; but if unfavourable, from a defective specification, generally calls for further information.

Supposing a patent is attacked in a court of justice, is it an answer to that attack, that the Commissioners have investigated it and have granted the patent, and that therefore any objection to it is precluded?—No; I believe the Commissioners do not take any such responsibility upon themselves, and I do not think it would be expedient that they should do so; I think that that which the Commissioners do is tantamount to that which the Attorney-General here ought to do; he reports that he has examined this subject, and thinks it will be for the benefit of the country that the King should grant a patent; whereas we all know that the Attorney-General is otherwise occupied, and that he is not at all acquainted with any more than the petition.

Then you conceive it is no defence to the patentee himself, to say, that this has been examined by the Commission?—I think none at all; because, if it was, no patent could be overturned upon any grounds; for the Commissioners having awarded the application, and a patent having been granted, would, upon those grounds, be established as a good one; whereas it frequently happens that, either because the thing has been used before, or has been published before, or upon some other ground, it is overturned.

Are patents ever overturned upon the ground of their not being sufficiently described?—I think that never can be a ground, because it would be known in the progress of the investigation that such would be likely to be a ground of opposition to it, and the parties would take care to amend it.

Is that the case in England?—No, it cannot be the case in England; because, in France, the specification is always open, to have a rider appended to it, which is a further explanation of the matter; but in England you cannot alter a single letter which you may even have inserted in error; I have lately been obliged to go over a patent again, in which there was an error of a single letter only; it was the

word *pressing* instead of *dressing;* and I have been obliged to solicit the patent again.

What expense might that have put you to?—The principal fees and stamps being allowed, I should suppose it will ultimately cost thirty or forty pounds.

Do you happen to know whether it is a bar to taking out a patent in France, if they know that that patent is already in existence in another country?—No, that is not a barrier to taking out a patent in France; there is a condition that, when you take out a patent in France, you shall not take out a patent any where else, or, if you do, your patent in France is vitiated; the same happens in all the other Continental States, but that is got over with the greatest ease, because you employ your agent, or your brother, or your friend; and so an invention runs through all the countries, beginning in America and coming to England, then Scotland, then Ireland, then France, Holland, Prussia, Austria, and Russia; and that is the course they generally take all the way, under different names, beyond England, Scotland, and Ireland.

Before what tribunal is a patent defended, when it is infringed in France?—I have understood it is before the Court Royal.

Is it tried before a jury?—I believe it is; but I am not sufficiently acquainted with the proceedings to answer that question.

Is the question referred to the Commission?—No, to the Courts; I know that, because the Courts have differed as to the interpretation of the laws of patents; the Court, in one part of the country, has decided one way, and the Court, in another part, has occasionally decided in another; for instance, it was first considered that the publication of an invention which should invalidate a patent, must be in the French language: it was afterwards determined that, if it was published in any other language, and produced in France, it would vitiate the patent, and it was ultimately asserted (but I do not know whether it was established as the law) that the mere enrolment of an invention in another country, where it was open to the examination of the world, was a publication.

Do you know what is the expense of a patent in France?—It depends upon the length of time for which it is granted; the patents are granted for five, for ten, and for fifteen years; the Government duty upon a five years patent is 300 francs, about £12, exclusive of other fees enrolments, and so on, which are trifling; for ten years it is 800 francs, which is £32, and for fifteen years it is 1500 francs, which is about £60.

To be continued.

A PRESSURE MEASURE,

By B. Bevon, Esq.

To the practical mechanic, it is often desirable to ascertain the actual pressure produced by various machines and instruments; and it is often desirable to do this in spaces too small to admit the ordinary machines for measuring the force of pressure; such, for

instance, as powerful screw and hydraulic presses, and other machines of that nature. To the screw, and all its modifications, there always belongs a very considerable portion of friction at present not well determined:—the proportion of friction to the gross pressure in the hydraulic-press, has not been satisfactorily ascertained.

Having lately discovered a mode of measuring the actual pressure, in small spaces, with considerable accuracy, Mr. Bevan takes the opportunity of offering it to the public.

If we take a leaden bullet of any determinate diameter, and expose it to pressure between plates of harder metal, made to approach each other in a parallel position, the bullet will be compressed or flattened on two opposite sides in an equal degree; provided the lead is pure, the degree of compression will indicate the amount of pressure. With a graduated press of the lever kind, it will be easy to form a scale of pressure corresponding to the different degrees of compression, until the ball is reduced to a flat circular plate, of about one-fifth of an inch in thickness; and it will be found, that an ordinary bullet of about five-eights of an inch diameter, will require a pressure of near 4000 pounds to effect this degree of flattening. Suppose, therefore, we wish to measure an actual pressure, supposed to be nearly twenty tons, we have only occasion to place ten or twelve of these balls at a proper distance asunder, so as not to be in contact when expanded, and then to measure by good calipers, or other suitable means, the compression of each ball, either by its thickness or diameter, and afterwards add into one sum the particular pressure due to each ball, from the scale first made, by using the lever press before-mentioned.

By this mode he has ascertained the amount of friction of an iron screw press, with rectangular threads, to be from three-fourths to four-fifths of the power applied, or the actual pressure has not excceeded four or five tons, when the calculated pressure, if there had been no friction, would have been twenty tons.

The larger the ball, the greater will be the pressure necessary to reduce it to a given thickness. An ordinary leader shot, of one-eighth of an inch diameter, will require nearly 100 pounds to compress it to a flat plate.

By using a ball of five-eighths of an inch diameter, he has found the actual pressure of the common bench vice to be about two tons, when under the same force, if there had been no friction, the pressure would have been eight tons.

In the practical application of these balls, it will be convenient to make a small impression upon them with a hammer, before they are placed between the plates, to prevent them from rolling out of their proper position. This operation will not be found to interfere with the result, as it is the ultimate compression only that is sought, and which is not affected by that of a smaller degree before impressed. This property will also be found very con-

venient; for, we may use the same substance several times, by taking care that each succeeding pressure exceeds that of the preceding, in the same manner as Wedgewood's pyrometers are used to measure any greater degree of heat than what they have been formerly exposed to.

It may be observed, that the application of these leaden balls to determine the actual pressure will not interfere with the regular operation of a press, as the articles under pressure may be in the press at the same time the balls are used, which of course must be placed between separate plates.—*Phil. Mag.*

PASSAGE OF CARBONIC ACID GAS THROUGH A BLADDER.

Observed by THOMAS GRAHAM, Esq., of Glasgow.

IN the course of an investigation respecting the passage of mixed gases through capillary openings, the following singular observation was made.

A sound bladder, with stop-cock, was filled about two-thirds up in this flaccid state, into a bell-jar receiver, filled with carbonic acid gas, and standing over water. The bladder was thus introduced into an atmosphere of carbonic acid gas. In the course of twelve hours, instead of being in the flaccid state in which it was left, the bladder was found distended to the utmost, and on the very point of bursting, while most of the carbonic acid gas in the receiver had disappeared. The bladder actually burst in the neck, in withdrawing it from under the receiver. It was found to contain thirty-five parts of carbonic acid gas by volume in one hundred. The substance of the bladder was quite fresh to the smell, and appeared to have undergone no change. The carbonic acid gas, remaining without in the bell-jar, had acquired a very little coal gas.

The conclusion is unavoidable, that the close bladder was inflated by the insinuation of carbonic acid gas from without.

In a second experiment, a bladder containing rather less coal gas, and similarly placed in an atmosphere of carbonic acid gas, being fully inflated in fifteen hours, was found to have acquired forty parts in one hundred of this latter gas. A small portion of coal gas left the bladder as before.

A close bladder, half filled with common air, was fully inflated in like manner in the course of twenty-four hours. The entrance of carbonic acid gas into the bladder depends, therefore, upon no peculiar property of coal gas. The bladder, partially filled with coal gas, did not expand at all in the same bell-jar containing common air or water merely.

The jar of carbonic acid gas standing over water, the bladder was moist, and we know it to be porous. Between the air in the bladder and the carbonic acid gas without, there existed capillary canals through the substance of the bladder, filled with water. The surface of water at the outer extremity of these canals being exposed to

carbonic acid, a gas soluble in water would necessarily absorb it. But the gas in solution, when permeating through a canal, it arrived at the surface of the inner extremity, would rise, as necessarily, into the air in the bladder, and expand it. Nothing but the presence of carbonic acid gas within could prevent the disengagement of that gas. The force by which water is held in minute capillary tubes might retain that liquid in the pores of the bladder, and enable it to act in the transit of the gas, even after the pressure within the bladder had become considerable.

HEIGHT OF THE PATAGONIANS.

An officer of Captain King's expedition communicated to us the following interesting notice.

Measurement of the largest Patagonian in a tribe of about 150 in number.

	Feet.	Inches.
Height	6	2
Circumference of the chest	3	11
Ditto of the loins	3	5
Ditto of the pelvis	3	10

The shortest man in their party was five feet ten inches and a half high; the generality of them appeared to be about six feet, with large bodies. The women, I thought, were larger in proportion to the men than is observed in civilized society.

Chronometers.—The annual public trial of these beautiful pieces of mechanism closed on the 31st of July, when the prize was awarded to a chronometer, Dent, No. 114.

	Mean Rate.		Extreme Variation between any two Days.
1828, Aug.	× 3″ · 43	1828, Aug.	0″ · 7
Sept.	× 3 · 85	Sept.	1 · 7
Oct.	× 3 · 73	Oct.	0 · 8
Nov.	× 3 · 87	Nov.	0 · 9
Dec.	× 3 · 93	Dec.	1 · 1
1829, Jan.	× 3 · 59	1829, Jan.	1 · 4
Feb.	× 3 · 59	Feb.	1 · 9
March	× 3 · 74	March	1 · 2
April	× 3 · 60	April	1 · 1
May	× 3 · 58	May	1 · 2
June	× 3 · 73	June	0 · 8
July	× 3 · 97	July	1 · 6

Greater rate in July ....3″ 97
Lesser rate in August ...3 · 43

Actual Variation....0 · 54

From the above, it will be seen that its variation between any two months during the year is 0″ · 54, being a trifle more than *half a second*! The reward, though now comparatively small, answers the proposed end—the gradual improvement of the chronometer.

LEVEL OF THE CASPIAN.—Mr. William Monteith lately made a series of observations with Fahrenheit's thermometer in boiling water, at different heights on the shores of the Black Sea and the Caspian Sea. At the level of the Caspian Sea, water boiled at 212 deg. 75 min., the barometer stood at 28°. 7.″. 1′.; hence the surface of the Caspian is 375 feet below the level of the sea.

INSTANTANEOUS TRANSMISSION TO DISTANT PLACES.—Mr. T. W. C. Edwards, lecturer on experimental philosophy and chemistry, states that he has invented an instrument "for the instantaneous conveyance of intelligence to any distance." After noticing some of the greatest inventions of preceding times, Mr Edwards "undertakes to demonstrate, clearly and briefly, in the work which he has now in the press, the practicability and facility of transmitting from London, *instantaneously*, to an agent at Edinburgh, Dublin, Paris, Vienna, St. Petersburg, Constantinople, the Cape of Good Hope, Madras, Calcutta, &c. any question or message whatever, and of receiving back again at London, within the short space of one minute, an acknowledgement of the arrival of such question or message at the place intended, and a distinct answer to it in a few minutes." He adds, "In principle this engine is altogether different from every kind of telegraph or semaphor, and requires neither intermediate station nor repetition. In its action it is totally unconnected with electricity, magnetism, galvanism, or any other subtle species of matter; and although the communication from place to place is instantaneous, and capable of ringing a bell, firing a gun, or hoisting a flag, if required; yet this is not effected by the transit of any thing whatever to or fro; or in the operation is aught either audible or visible, except to the persons communicating. It may be proper, however, to state, that a channel or way must previously be prepared, by sinking a series of rods of a peculiar description in the ground, or dropping them in the sea; but these, after the first cost, will remain good for ages to come, if substantial when laid down."

HARDY KINDS OF OLIVES.—Two new species of the Olive have been discovered in the southern district of the Crimea; this discovery will render it practicable to rear this useful tree in much more northerly climes than has been hitherto possible. The shoots which were planted in the botanical garden of Nikitæ, have lived through one of the hardest winters ever known, though the severity of the weather would have been fatal to the French or Italian olive.

EAST INDIAN LEAD AND COPPER REDUCTION.—The native method of reducing the metal is at once simple and economical. The ore is pounded very small. It is then mixed with wet cow-dung, and rolled into balls; and these, after having been dried in the sun, are with the addition of a small quantity of charcoal, set on fire. The heat produced by this process, with the assistance of the bellows, is sufficient to separate the metal, which is then collected for commerce.

LAUREL.—The butchers of Geneva have a singular mode of preventing flies from attacking the meat in their shops. They rub the walls and boards upon which the meat is placed with the essential oil of laurel, the smell of which keeps away this troublesome insect.

LIST OF NEW PATENTS SEALED.

MACHINERY.—To T. J. Fuller, of the Commercial Road, Limehouse, Civil Engineer, for an improved mechanical power applicable to machinery of different descriptions.—Dated 28th October, 1829.—Specification to be enrolled in Six months.

GAS REGULATOR.—To G. Danre, of Birmingham, Manufacturer, for a self acting air or gas regulator, which may be applied to other purposes.—Dated 2nd November, 1829.—Six months.

MILLS.—To J. M'Curdy, of Great James Street, Bedford Row, Gentleman, for certain improvements in the method of constructing mills and mill stones for grinding. Communicated by a foreigner.—Dated 2nd November, 1829.—Two months.

STEAM BOILERS.—To J. Viney, of Piccadilly, Colonel in the Royal Artillery, for certain improvements in steam boilers, &c.—Dated 2nd November, 1829.—Six months.

LIGHT.—To J. Soames, Junr. of Wheeler Street, Spitalfields, Soap Maker, for a new preparation or manufacture of a certain material produced from vegetable substance, and the application thereof to the purposes of affording light.—Dated 2nd November, 1829.—Six months.

PROJECTILE.—To J. Tucker, of Hammersmith, Brewer, for an exploding shot or projectile.—Dated 2nd November, 1829.—Six months.

PIANO FORTES.—To J. Stewart, of George Street, Euston Square, Piano Forte Maker, for certain improvements on piano fortes.—Dated 2nd November, 1829.—Two months.

BRICKS.—To J. Cowderoy, of Britannia Street, City Road, Gentleman, for certain improvements in machinery for making bricks.—Dated 2nd November, 1829.—Six months.

SILKS.—To F. Nash, of Stoneason, near Wells, Gentleman, for certain improvements in the manufacture or application of silks mixed or combined with other articles —Dated 2nd November, 1829.—Two months.

BATHS.—To W. Gooch, of Mount Street, Berkley Square, for certain improvements on baths of different descriptions.—Dated 7th November, 1829. —Six months.

SYRINGES.—To D. Macdougall, of Edinburgh, Horticulturist, for certain improvements on or additions to syringes applicable to garden and other purposes.—Dated 10th November, 1829.—Six months.

CHANDELIERS.—To T. Osler, of Birmingham, Chandelier Manufacturer, for certain new improvements in the construction of glass and metal chandeliers.—Dated 10th November, 1829.—Six months.

MACHINERY.—To J. Gibbs of Crayford Mills, Timber Merchant, for improvements in machinery for cutting marble, wood, and other substances. —Dated 12th November, 1829.—Six months.

SHIP'S SCUPPERS.—To J. Dodgson, of Lower Shadwell, Pump and Engine Maker. for certain improvements in ship's scuppers.—Dated 17th November, 1829.—Six months.

WOOLLEN CLOTHS.—To T. Gethen, of Furnival's Inn, Gentleman, for certain improvements in dressing woollen cloths.—Dated 21st November, 1829.—Six months.

SHEARS.—To W. Clutterbuck, of Oylebrook, near Stroud, for certain improvements in the shears used for cutting or cropping of woollen cloth and other fabrics requiring shearing.—Dated 21st November, 1829.—Two months.

DESCRIPTIVE ACCOUNT OF ALL THE

PATENTS ENROLLED BETWEEN 20TH NOVEMBER AND 20TH DECEMBER, 1829.

Particularizing the Offices in which the Specifications may be inspected, with the Dates of Enrolment.

RAILWAY.—To Maxwell Dick, of Irvine, Airshire, bookseller and publisher, a patent for "an improved rail-road, and method of propelling carriages thereon, by machinery, for the purpose of conveying passengers, letters, intelligence, packets and other goods with great velocity," was granted on the 21st of May, and the specification was deposited in the Enrolment Office on the 21st of November, 1829.

The principal improvement contemplated by the patentee is to obviate the necessity and expense of levelling a country, where it may be proposed to lay down a railway, by supporting the railway upon piers, as proposed by Mr. Palmer in his Patent Railway, only that, instead of a single railway, the patentee proposes to suspend the carriages from a rail on each side, and also to introduce two additional rails, which he denominates "safety rails," against which friction wheels attached to the carriages shall act in case of the carriages receiving from any cause an impulse upwards. There is also an arrangement of wheel-work for communicating great velocity to light carriages, which are impelled upon the rails by any internal power. We fear much that this plan of supporting on pillars these double rails, with safety rails and friction rollers, will not be found so convenient or economical as the patentee anticipates.

FELT.—To Thomas Robinson Williams, of Norfolk Street, Strand, London, a patent for "improvements in the making or manufacturing of felt or a substance in the nature thereof applicable to covering the bottoms of vessels and other purposes," was granted on the 23d of May, and the specification was deposited in the Enrolment Office on the 23d of November, 1829.

Mr. Williams proposes to manufacture felt of hair or wool, cotton, hemp, flax, or other fibrous substance, according to the purposes for which the felt is intended. He employs two endless wire webs passing round revolving cylinders or rollers, and pressed together by being passed, with a layer of the material to constitute the felt between them, through of two rollers, whose distance is regulated by screws acting upon the plummer blocks in which the axis of one of the rollers turns. The materials are to be distributed upon the wire webs in the usual manner: they are brought

together by the approach of the wire webs, which are made during the progress of manufacture to pass through a vessel containing a mixture of oil, wax, rosin, or pitch, in a melted state. The felt thus becomes saturated with a compound which renders it impervious to water. Hence, it becomes a fit article for covering the bottoms of ships or other vessels, or of being employed as coverings in situations exposed to the weather.

The patentee does not claim as his invention the materials employed, nor the method of distributing them upon the wire webs, nor does he confine himself to the employment of the endless webs, as two webs of any other description, or of any other suitable material, though the preference is given to wire, may be substituted.

The resinous compound is to be kept in a melted state, by a coil of steam pipe within the vessel containing it, and the pressing rollers are placed so that the superfluous mixture squeezed out by them may be returned into the melting vessel. This patent process of manufacturing felt is not without merit, and it may be the means of extending the application of that article to many useful purposes.

Water-Closets.—To Hayward Tyler, of Warwick Lane, London, brass-founder, a patent for "certain improvements in the construction of water-closets," was granted on the 22d of September, and the specification was deposited in the Enrolment Office on the 23d of November, 1829.

This patent embraces two improved constructions of water-closets, and is illustrated by numerous drawings, but which we refrain giving, as we perceive little novelty or merit in the contrivances, which may be briefly described as follows:—In the first place, the discharge aperture is opened and closed by a plate-valve turning horizontally upon a pivot, and moved by a lever, with a toothed sector at its extremity, acting upon another sector attached to a square shoulder on the pivot or axis of the valve. This plan of opening and shutting valves would, it is to be feared, be quite as liable to derangement by pieces of paper and other substances sticking to their edges, as the hinged-plate valves now in use are, and this constitutes their principal imperfection.

The second improvement claimed is for a cup-valve instead of the plate-valve, the upper rim of the cup pressing against a circular leather, and thus forming a tight joint to prevent the escape of any smell from the receiver below the pan. This leather seems to be the improvement claimed; but, according to the patentee's own showing it is unnecessary, as the cup will always retain sufficient water to constitute an effectual hydraulic joint, except for the retention in the

pan of a quantity of water sufficiently large effectually to wash away the soil. This part of the plan is, however, liable to objections similar to the last.

Dressing Cloth.—To Joseph Chisild Daniell, of Simpley Stoke, Wiltshire, clothier, a patent for "certain improvements in machinery applicable to dressing woollen cloth," was granted on the 26th of May, and the specification was enrolled in the Enrolment Office on the 24th of November last.

Mr. Daniell had formerly obtained patents for various improvements in the processes of dressing woollen cloth, and the present may be considered as an addition to these. It consists in the introduction of a set of spiral springs between the card-board and the cylinder-board of the gig-mill, by which the pointed wire cards are prevented from fixing so tight into the cloth as to injure its quality. The front edge of the card-board is attached to the gig-mill by a pair of hook-and-eye hinges, which admit of their being easily detached for the purpose of repairing or renewing the cards, and the back edge is supported on spiral springs. The wire points constituting the cards do not project at right angles to the surface of the cloth, but are bent forwards so as to act upon it, and more effectually to raise the pile; but when the wire points penetrate too far into the cloth, and become fast, the springs under the back edge of the board give way a little, allowing the board to turn on its hinges, and thus alter the angle of the wires, with respect to the surface of the cloth, sufficiently to permit them to pass on without tearing, or otherwise injuring it.

Soap Manufacture.—To Charles Turner Sturtevant, of Hackney, Middlesex, soap boiler, a patent for "certain improvements in the process of manufacturing soap," was granted on the 26th of May, and the specification was deposited in the Enrolment Office on the 26th of November, 1829.

The intention of this patentee is to obtain a soap from the combination of pure alkaline lees with animal or vegetable oils, without the employment of barilla, kelp, or other crude material, that he may avoid the obnoxious, tedious, and expensive process of separating the refuse material called the black ash. He commences the process by dissolving in a copper boiler, capable of containing about three tons, a small quantity of soap in water, and then adds, alternately, small quantities of the caustic pot-ash (or pure alkaline lees) and animal or vegetable fatty matter, at the same time increasing the heat, and stirring the mixture until the ingredients become thoroughly incor-

porated; and when the boiling is completed, the soap is run off into moulds and cut into pieces, in the usual manner. This process has the merit of being exceedingly simple; and it may serve to render certain a manufacture which has hitherto been conducted very much by chance, owing to the difficulty of ascertaining the real quality of some of the crude materials employed.

Railway Carriage.—To Ross Winans, of Vernon, Sussex, and New Jersey, United States, at this time residing in London, a patent for "certain improvements in diminishing the friction of wheel carriages to be used on rail and other roads, and which improvements are also applicable to other purposes," was dated on the 28th of May, and the specification was enrolled in the above Office on the 28th of November, 1829.

The plan of diminishing friction proposed by the patentee, is to suspend the weight of the carriage on the interior of a set of friction wheels, whose peripheries extend considerably beyond the axes on which they turn. One of the advantages pointed out by the patentee is, that in cases of slight turnings, or inequalities in the railroad, the pivots resting on the peripheries of the friction wheels will pass a little backwards or forwards, and thus permit the wheels to accommodate themselves to the rails. We understand that some trials have recently been made on the Manchester and Liverpool Railway with Mr. Winan's wheels, and that the results proved very satisfactory.

Air Engine.—To William Mann, of Effra Road, Brixton, Surrey, Gentleman, a patent for "the application of compressed air to communicate power and motion to fixed machinery, and to carriages and other locomotive machines, and to ships, vessels, and other floating bodies," was granted on the 1st of June, and the specification was enrolled in the Enrolment Office on the 30th of November last.

This is a proposal to employ condensed air to propel carriages and boats, the futility of which is too obvious to need any comment, although several patents have been taken out for the purpose, one of which, by Mr. Bumpus, has been already described in the *Register of Arts*, &c. A plan for propelling carriages through the medium of condensed air, was invented and published in a pamphlet by Mr. Medhurst, several years ago. The only novelty proposed by the present patentee is the application of several pumps of different capacities to be used in succession in charging the vessels, commencing with the largest, and finishing with the least, so that the

capacity of the pumps used may be in the inverse ratio of the force of air within the vessels.

Locks.—To Andrew Gottlieb, of Jubilee Place, Mile End Road, Middlesex, locksmith, a patent for "certain improvements or additions to locks and keys," was granted on the 1st of June, and the specification was deposited in the Enrolment Office on the 1st of December, 1829.

Mr. Gottlieb's invention consists in the application to the key-holes of locks of a piece of paper, so secured as to prevent its being removed without the introduction of a key passing through it; and hence any attempt to break open the lock would be indicated by the fracture of the paper. He proposes to introduce and secure the paper by means of a folding shield, with a hole in it similar to the key-hole in the lock plate; this shield is kept down by a spring catch, which cannot be disengaged for the introduction of a fresh piece of paper, except by the proper key, which is furnished with a projecting stud on the side of the key stem for the purpose of disengaging the shield catch when the key is turned. As a source of further security, the patentee proposes to employ checque-paper, with some design engraved upon it; and by having this paper bound in a checque-book, and a leaf torn off when required, so that the paper found on the key-hole at any time may be compared with the edge of the leaf left in the book, the substitution of another paper would of course be discovered. There may be some cases where this plan may be usefully employed, but we fear they are but few in number, and not very easily discovered; and we think that Mr. Gottlieb would have more advantageously devoted his ingenuity and money to some plan by which depredations might be prevented, rather than to a discovery of their having been committed or attempted.

Spinning.—To Charles Brook, of Melham Mills, Huddersfield, Yorkshire, cotton-spinner, a patent for "certain improvements in machinery for spinning cotton and other fibrous substances," was granted on the 4th of June, and the specification was deposited in the Enrolment Office on the 2d of December last.

It has been usual, in spinning machines, to pass the thread immediately from the last pair of extending or drawing rollers to the bobbin and flyer, where it receives the twisting operation. Now, between the last pair of drawing rollers and the twisting apparatus Mr. Brook introduces a roller covered with cloth, or something else to give its surface a degree of roughness. This roller is made to turn in a direction contrary to the direction in which the thread is

passing, and is so situated as to cause the thread to embrace a small portion of its circumference. and thus the fibres which would otherwise be left projecting from the thread are brought up previously to the operation of twisting, by which they are incorporated with it. To aid in this incorporation of the projecting fibres, moisture is applied to the thread by causing the surface of the roller to pass through water contained in a vessel situated beneath it. This is really an invention of much value: it is at once simple, cheap, and efficacious: by it, thread of the same strength, and containing an equal quantity of material, can be made smaller and more uniform, and hence of a quality more suitable for the other processes of manufacturing, which it has to undergo before it becomes fit for the fabric market.

Mr. Brook's specification details another improvement, consisting in the introduction, underneath the other rollers, of a long revolving roller with a roughened surface, for the purpose of taking up the broken ends of such threads as may give way during the operation, and thus the derangement of machinery usual on the breakage of threads is prevented.

KNEADING DOUGH.—To Moses Poole, of Lincoln's Inn, gentleman, a patent for "improved machinery for preparing or kneading dough, communicated by a foreigner," was granted on the 19th June, and the specification was deposited in the Enrolment Office, 19th of December last.

This specification describes three methods of kneading dough by machinery, which we shall notice in succession.

The first is by the application of a long revolving cylinder in a dough-trough, whose bottom is made into the portion of a circle of a diameter, somewhat larger than the diameter of the revolving cylinder. To the top of the dough-trough is fitted a flat lid, to which is attached a frame, containing a wooden scraper extending all along the cylinder, to prevent the dough from sticking to and being carried round with it. The proper quantities of flour and water, or other ingredients, used by bakers in the manufacture of bread, are to be well mixed together, and the kneading is to be commenced, covering the trough, and putting the cylinder in motion, by which the dough is kneaded by being forced repeatedly through between the cylinder and the bottom of the trough. The trough and revolving cylinder are so connected by levers, that the distance between them may be increased or diminished at pleaure.

The second plan is, to make the trough containing the dough revolve, with a number of heavy balls within it. The trough in this

case is made in the form of a parallelopipedon, the ends being square, and each of the sides a parallelogram, whose length and breadth are to each other as five is to one. One side of the trough constitutes a lid, which is removed to introduce the flour and water, and the trough is divided into as many cells as there are balls introduced. The patentee states, that, by the rotation of this trough, the dough and balls are elevated together, and, by their falling down, the dough will be subjected to beating, similar to the operations of the baker's hands.

In the third method the dough-trough is similar to that used in the first; but, instead of the revolving cylinder, a revolving agitator is employed, consisting of a series of rings angularly attached to an axis extending the whole length of the trough.

The revolving apparatus in all three methods are put in motion by a train of wheels, actuated by the power of a man, or other first mover, according to the quantity of work to be done at one operation.

Musical Instruments.—To Charles Wheatstone, of 436, Strand, London, musical instrument maker, a patent for "certain improvements in the construction of wind musical instruments" was granted on the 19th June, and the specification was deposited in the Enrolment Office on the 19th December last.

About two years ago a small musical instrument was brought from the continent to this country, and distinguished by the name of the German Æolian-harp. It consists of a thin metalic plate, with a series of rectangular holes about three-quarters of an inch long, and the eighth of an inch wide. Upon this plate a series of tongues are screwed or riveted, made to play loosely in the apertures in the first plate, and filed thin, according to the tone intended to be produced. These thin tongues being firmly fixed at one end, and made to play in the apertures, are put into vibration by forcing wind through them by which tones of great strength and variety are produced.

Now, upon this principle Mr. Wheatstone has founded his improvements in musical instruments, for which he has obtained a patent. His instrument consists of an air receiver, furnished with a mouth-piece to fill it with air from the lungs, and as many of the apertures and vibrating tongues as there are intended notes on the instrument. On each side of the instrument are placed short projecting finger-knobs, by which the air is admitted at pleasure to any of the notes of the instrument. The keys, or finger-knobs, are arranged, in a kind of double row on each side, so that the finger may be applied to one or more at the same time, and the notes which constitute a chord are placed adjacent, so that the application

of the finger to two of them at the same time shall not produce disagreeable sounds.

Mr. Wheatstone also includes in his patent an improvement on the small instrument known by the name of the Chinese organ, which improvment consists in an arrangement of the pipes, by which the fingers can more readily reach and stop or open them while playing. He places the tubes in a circular order in the lower extremity of the mouth-piece, with the sound apertures distributed according to the position of the fingers when the hands encompass the instrument.

Musical Instruments.—To Francis Day, of the Poultry, London, optician, and August Münch, of the same place, mechanic, a patent for "certain improvements in musical instruments, partly communicated by a foreigner," was granted on the 19th June; and the specification was deposited in the Enrolment Office on the 19th December 1829.

These patentees, like the last, have taken for the foundation of their improvements the German Æolian-harp, but have produced an instrument of much greater power and utility. This instrument is furnished with keys precisely similar to those of a piano-forte; the air is supplied to the receiver by a pair of organ-bellows, actuated by the foot; and the tones produced by this arrangement of parts are exceedingly melodious and very powerful. The system of levers, by which the notes are opened by the operation of the player on the finger-keys, can easily be imagined, as they are not unlike those of a piano-forte; but there is one addition which we must not omit to mention, as it gives a peculiarity to the music produced by this instrument. The addition which we allude to is the application of a small spiral spring under each key, by which more powerful notes may be produced, simply by the application of greater pressure on the keys, and thus the player can regulate the strength of his music at pleasure.

NEW AIR ENGINE.

The following sketch of an Air Engine for obtaining the advantages of all the expansive force of heated air, as well as the force arising from the semi-explosions of the inflammable gas evolved from the fuel, is extracted from Dr. Arnott's Elements of Physics, Vol. II., Part I., treating of heat and light, just published.

If, says the designer of this ingenious apparatus, we suppose a fire *a* (fig. 4, Pl. xii.) to be placed in a grate near the bottom of a close cylinder *d a*, and the cylinder to be full of fresh air recently

admitted, and if we then suppose the loose piston *g d* to be pulled upwards, it is evident that all the air in the cylinder above *d* will be made to pass by the tube *e* through the fire, and will receive an increased elasticity tending to the expansion or increase of volume, which the fire is capable of giving it. If there were only the single close vessel *d a*, the expansion might be so strong as to burst it; but if another vessel *b c* of equal size were provided, communicating with the first through the passage *b*, and containing a close-fitting piston *c f*, like that of a steam engine, the expansion of the air would act to lift the said piston, and by means of it might work water pumps, or do any other service which a steam engine can perform. At the end of the lifting stroke of the piston *f c*, it might be made to open an escape-valve for the hot air, placed in any convenient part of the apparatus, and to cause the descent of the blowing piston *d* to expel this, while a new supply of air would enter by another valve into the cylinder above *d*. The engine would then be ready to repeal its stroke as before, and the working would be continued as in a steam engine.

PATENT APPARATUS FOR MEASURING AND REGISTERING THE QUANTITY, &c. OF FLUIDS IN TRANSIT.

By Mr. Brunton, of Leadenhall-Street, London, 1829.

I measure and register certain fluids in transit by passing them through a cylinder with a piston and rod, nozzle and valve, or cock, in all respects like those of a steam engine, excepting that I prefer to pack the piston with leather, when the fluid to be measured does not exceed 80 degrees of heat (Fahrenheit). The fluid, by its static pressure against the piston, moves it with sufficient force to raise a weight upon an inclined plane, during the whole range of the impulse, and thus generating a power which at the termination of the impulse is capable of moving the valves or cock, and reversing the static pressure on the piston, which causes a new impulse in the opposite direction, during which the weight is again raised: thus each impulse generates a power capable of changing the position of the cock or valve, and produces a continuity of motion, expressive of the quantity of fluid discharged.

a b, fig. 1, (see Plate XII.) represents the cylinder, which I prefer to be laid horizontally, with the nozzles upward, in order that air (if there should be any) may readily escape on the introduction of the fluid to be measured; *c* and *d*, (fig. 2) are the guides for the piston rod, the cross bar of which works in the slits, at the end of which are adjusting screws, which prevent the piston from moving beyond its proper limits. *e e* are two guards, which being placed immediately under the range of the pin of the roller *f*, prevent it from falling until it has attained the ends of the guards *e e*, which are adjusted to suit the same limits of stroke as the pins in the guides *c* and *d*; the roller *f*, and connecting rod *g*, are made sufficiently heavy, either in their own substance or by weights added thereto, to

move the cock or valve freely, when acting upon the ends of the reciprocating lever *h*.

To ascertain and register the specific gravity of fluids in transit, I suspend or fix a cistern or vessel upon the end of a beam or balance, having the pipes which convey the fluid to and from the said vessel extended to the centre line of the balance, and there united to the conveyance pipes by two flexible joints. To the opposite end of the said beam a weight is suspended, capable of balancing the cistern when filled with a fluid of the mean specific gravity of that particular fluid which it is intended to be assayed.

To any convenient part between the centre of the beam and the end, I suspend or attach a plunger of glass, ivory, or other suitable material, a part of which is immersed in mercury, so that if the fluid in the cistern be heavier or lighter than the balance weight at the opposite end, the equilibrium will be restored by the immersion or emersion of a portion of the plunger; the point at which the beam will be in equipoise will therefore be expressive of the specific gravity of the fluid contained in the cistern or vessel.

For the purpose of ascertaining and registering the temperature of fluids in transit, I construct what I call an operative thermometer, by uniting several discs or circular plates of thin copper or brass alternately by their edges and middles; through the centre of the united plates I make a small hole, which forms a communication through the whole series of discs, and constitutes a metallic cellular vessel, capable of some degree of expansion and contraction by the elasticity of the plates of metal; this vessel is united to a coil of pipes capable of containing from 50 to 300 times more than the contents of the cellular vessel or discs. I fill the coil of pipes and the cellular vessel with spirits of wine, linseed oil, or any other suitable fluid possessing sufficient expansibility by heat, and close the same perfectly tight. The coil is then inclosed in a cistern or chamber, through which that fluid passes, the temperature of which is to be ascertained, and in its transit communicates its temperature to the fluid contained in the coil, and causes an expansion or contraction of its volume (similar to that in the mercury of an ordinary thermometer), which increase or diminution is forced into the cellular vessel, or drawn from it, and will cause it to expand or contract accordingly, and thereby express the temperature of the fluid surrounding the coil contained in the cistern or chamber.

Having explained the respective methods by which I ascertain the quantity, specific gravity, and temperature, I now proceed to describe and ascertain the manner in which they are combined, and constitute one machine, apparatus, or instrument (as shown by fig. 3,) the particulars of which are more clearly exhibited in figs. 4, 5, and 6, in all of which the respective parts are represented by the same letter or letters.

I construct a frame or balance A A B B, figs. 3 and 4, which is suspended on the centres *a b*. To the end A of the said frame or balance is fixed the cistern C, with the operative thermometer E, also the measurer D, (as already described in fig. 1.)

From the exit branch of the cock is extended a bended pipe *c*, terminating against or upon the centre line or axis, within the balance frame, in a glass mouthpiece, covering the end of a perpendicular pipe of glass *d*, standing up in the middle of a cup of mercury *e*, in which the mouthpiece is inserted so far as to resist the statical pressure of the fluid within.

Another pipe *g* connects the cistern *c* with the induction branch of the cock, through which the fluid enters the cylinder D. Another pipe *k* extends from the cistern to the centre line of the balance frame, and there terminates in a glass mouthpiece inserted in a cup of mercury, in all respects like that already described, only connected with the induction pipe *f*.

I attach to the balance frame, as at *l*, a plunger *m*, suited in its shape and section to the nature of the fluid it is intended to weigh or assay, which plunger is inserted in the mercury contained in the cup *n*. To the end B of the balance is attached a weight sufficient to counterpoise the end A with its appendages, when filled with fluid of the mean specific gravity of that for which the machine is intended. It will now be manifest, that if the machine be thus constituted, and spirituous liquor be poured through the pipe *f*, it will fill the chamber *c*, and then through the pipe *g* will fill the ends of the cylinder alternately, and will ultimately run out at the pipe P. That the air may be perfectly expelled from the machine when it is set to work, the cock *p* must be shut, and the small air cocks *q q* in the pipes *c* and *k* opened, until a small quantity of the liquor rises through them, when they must be shut and the cock *p* opened; the machine being supplied with spirituous liquor will, by the number of the strokes of the piston, indicate the quantity passed through the machine. The preponderance of either end of the balance frame indicated by the pointer on the scale *r*, will express the specific gravity of the liquor; and the thermometer E will, by its expansion or contraction, indicate the temperature of the liquor as it passed.

I will now describe the manner in which these particulars, viz. the quantity, specific gravity, and temperature, are registered. I construct upon the sector of the cock or the valve a pair of pallets, which work into and turn round, tooth by tooth, the wheel *r* upon the end of the shaft *s*, which extends to the centre line of the balance frame, (see figs. 1 and 2,) and there by a screw communicates motion to the wheel *t* and the cylinder *u*, on the outside of which is fixed a paper, fig. 4. This cylinder is supported upon two centre points, screwed into the top and bottom of the cylinder frame F G, fig. 6. Into the same frame, and in the centre line of the balance frame, are fixed two guides, *w* and *x*, with internal grooves, as shown in the plan, fig. 4,) to guide two pencils parallel with the surface of the paper, to indicate the temperature and specific gravity.

At a short distance from the lower end of the cylinder is suspended the lever V, into which is fastened a pencil pressing against the surface of the paper on the cylinder. From the middle part of the lever extends upwards a rod and loop, which rest upon a small cam or eccentric on the shaft *s*, which by every revolution raises the

pencil of the lever v a short distance, and letting it fall again, makes upon the paper an indented line thus ~~~~~~~, expressive of so many gallons or other specific measures, according to the capacity of the measuring cylinder, and the number of teeth in the wheel *r*.

Near to the upper part of the cylinder *u* another pencil is fixed into a socket easily moveable between the guides *w* and *x*, and occupying the grooves nearest to the cylinder *u*; this socket is connected by a rod to the end of the lever H, which communicates motion by the expansion or contraction of the thermometer E to the pencil, which will describe upon the revolving paper a line expressive of the temperature of the liquor, of which the lever V marks the quantity. Another pencil is fixed into a socket easily moveable between the guides *w* and *x*, and occupying the grooves farthest from the cylinder *u*; this pencil is connected by the connecting rod *z* to the lever I, supported upon the upper end of *l*. The other end of the lever I is attached to the fixed point *y* by the rod *i*. Then, as either end of the balance frame preponderates, the lever I will move the pencil between the guides *w* and *x*, and upon the revolving paper will describe a line more or less elevated, expressive of the specific gravity of the liquor, the quantity of which is marked immediately under.

The paper, before it is put upon the cylinder, I rule with lines suited to the strength and temperature of the liquor to be assayed: thus, to express the specific gravity of spirits, I draw a strong line at the same height from the bottom of the paper as the pencil of the machine would mark, if the machine were filled with proof spirits.

Also, to show the temperature by ruling a strong line at the height where the machine would mark 60 degrees Fahrenheit; then, on each side of these lines at proper distances, I draw parallel lines, expressive of the higher and lower degrees of the specific gravity and temperature, which may be found practically useful.

The value of the lines drawn by the machine are rendered easily determinable by their falling between or intersecting these preparatory lines of known import.

In the application of part or parts of this invention to other purposes, I construct an instrument by combining the motion of the balance frame and that of the operative thermometer to affect one index or pencil, and to indicate or register the strength of the spirits, as if the whole were sampled at one temperature; for which purpose I divide the portion of the plunger *m*, fig. 7, which I intend shall work in and out of the mercury, into 100 equal parts, with subdivisions, by which all the varieties of specific gravity, from distilled water to alcohol, shall be indicated.

I then construct another plunger, (which I distinguish from the other by the appellation of the compensation plunger,) of the same length, and divide it in the same manner, and I make its sections at these divisions proportionate to the expansibility (by heat) of spirits of the various specific gravities expressed by these divisions. The compensation plunger works in the same cup with the other plunger, and is attached to the lever *a b*, fig. 7, the fulcrum of which is in the

centre line of the axis of the balance frame, and its other end connected to the operative thermometer, so that its motion between the point at which it stands at 30 degrees Fahrenheit, and that at which it stands at 80 degrees, shall be sufficient to emerse or immerse a portion of the plunger, and thereby move the balance frame so as to indicate or register an expression of the specific gravity, as a compensation for the expansion or contraction of the spirits in the machine by their temperature being above or below the degree of heat at which it is intended to register their strength.

The two instruments specified are only applicable to what are known by the term spirituous liquors, at some intermediate temperature between 30 degrees and 80 degrees Fahrenheit.

I also ascertain and register the quantity and temperature of water for feeding steam-engine or other boilers, by the application of the measuring part of the above-specified apparatus with the revolving cylinder (*u*) and the operative thermometer, without any part of the apparatus which respects the specific gravity. In this application I prefer the piston to be packed with flax or hemp.

I also measure the quantity of spirituous liquors, wine, or other fermented liquor, by the application of the measuring part of the apparatus only.

I also regulate the heat or temperature of the inside of still-heads, worms, or other vessels, which it is desirable to maintain at an equal heat, and to which my operative thermometer may be applicable; by inserting the coil of the operative thermometer into the still-head, worm, or vessel, and connecting the expansive and contractive force of the instrument to the shutting and opening of the steam cock or valve through which such vessel may be heated, or to the shutting and opening of the damper of the fire by which such vessel may be heated, or to the opening and shutting or regulating the water cock or valve, by which the uniformity of temperature of each vessel may be maintained.

LAW OF PATENTS.

(Continued from p. 155.)

Mr. Samuel Clegg, civil engineer, stated to the Committee that he disapproved of the plan of allowing patentees to defer for several months the giving an explicit specification of their inventions, for the reasons given by other witnesses, whose evidence we have already given abstracts of. Mr. Clegg explained a variety of cases in which the disadvantages of the present law, as it relates to this point, were rendered manifest. He concurred in the opinion that it would be a great improvement in the law to render the patent secure from the moment of applying for it. With respect to the term of years (fourteen) for which patents were uniformly granted, Mr. Clegg considered that it was too

short for expensive and complicated machinery, as inventions frequently take that time to get them to perfection, and many years usually elapse before they can be rendered profitable to the patentee. Mr. Clegg thought that a power should be vested in some quarter to extend the duration of patents, upon a proper application stating that such a sum of money had been expended, and that the remainder of the time would not be sufficient to enable the patentee to get a remuneration for his expenses, or obtain a profit for his labour. In introducing any thing of a very novel description, strong prejudices operate for a long time to prevent its adoption; and to the great question, uniformly asked, no satisfactory answer can be given, until experience shall have proved it. By the present legal mode of extending the term of patents by acts of parliament great difficulties as well as great expenses are incurred. Mr. Clegg mentioned, that in applying to Parliament for an extension of the term to a patent of his own (we presume his gas-meter), he was opposed by all the gas companies throughout the country; they thought they could get the thing cheaper if the patent was not renewed; and so, after a number of years, and the expenditure of a great deal of money in perfecting the machine, it is thrown open to the public without any remuneration to himself. Mr. Clegg also mentioned the case of Mr. Perkins, who, he said, (incorrectly we believe,) had been *the whole fourteen years* making experiments for high-pressure steam, but had not yet been able to bring it into the market with his contrivance.

So far from thinking the present expense of a patent any evil, he thought it would be *better if it were more.* He, however, thought it would be a convenience, if persons were allowed to take out patents for shorter periods than fourteen years at a proportionably less expense.

In preparing such a specification as would support a patent, Mr. Clegg did not think there was much difficulty, when it was for an apparatus on a new principle; but if it were merely an alteration, or an improvement of the original patent, there was much difficulty in specifying such patent, because another slight variation or alteration of form would perhaps produce the same effect. Two-thirds of the patents taken out were of the latter description, which Mr. Clegg considered were improperly granted.

Specifications were sometimes purposely drawn defectively with the view of misleading the public, but he was not acquainted with any instances of the kind.* Mr. Clegg thought the present Lord Chief Justice very favourable to the law of patents; that he considered patent property more sacred than his predecessor;

* It is said, that that valuable quack medicine, James's Patent Fever Powders, cannot be prepared by the process given in the specification, and that it was designed to mislead. It is we believe *still* a secret with James's descendants, who find it to be the real "*Philosopher's Stone*."—Edit.

that he would not permit a patent to be set aside on account of *slight alteration*, or little technical differences.*

Mr. Clegg said, that he considered the expense of a patent "no consideration, because half a year's profit would pay the expense of a patent," and if the price of patents were much reduced, "the Patent Office would be so loaded, that a person could hardly bend an iron in a particular shape without running the risk of infringing a patent." Such a multiplication of patents, he conceived, would be a great impediment to improvements in machinery and the arts; but he was unable to inform the Committee of any instance in which a patent for a trifling thing had stood in the way of an important improvement. If a workman discovered any thing of the kind, there was "no difficulty" in procuring any one to join him in the expense of taking out a patent for it. If the expense of a patent were made something more, he considered it would be better. It would be a great convenience if there were offices established in the different manufacturing districts, in which copies of the specifications were lodged so as to be accessible to the public. Mr. Clegg's evidence concluded, by his giving a very erroneous account to the Committee of the practice of the Enrolment Offices in furnishing applicants with specifications of patents for perusal, which we omit giving on account of its incorrectness.

MR. JOHN MILLINGTON, *Professor of Mechanics at the Royal Institution*,

stated to the Committee, that he considered it would be an advantage to the public if the patentee could be secured from the date of his first application. Thought the French Law of Patents superior to our's, according to which the specification was lodged in the first instance, and the principal fees paid; after which, for the trifling fee of about thirty francs, an improvement may be added to it at any period during the term of the patent. In England it is necessary to take out a new patent for every successive improvement. In France the infringement of a patent is penal, and the articles made by such infringement are burned by the hangman. Imprisonment and fine are the penalties with which the invader is subjected. That nine-tenths of the patents which are taken out are not for things that have been patented before, but for things that existed before, which arises from a want of knowledge in the parties; and that is one of the mischiefs that attend the sort of secrecy there is in taking out a patent, that many persons imagine they have made an invention, and when

* Mr. Clegg, in his remarks, only shews his gratitude to the present Lord Chief Justice, who recently decided a difficult case in his favour, for we think the commendation undeserved. We were present in court, when the said Lord Chief Justice most arbitrarily nonsuited Barton, whose patent piston was attempted to be set aside by a "slight alteration" made in it by Messrs. Hall, of Dartford.

they bring it before the world, it appears to be a thing which existed before.

A great inconvenience arises from the necessity of keeping the invention secret during the two, four, or six months allowed for enrolling the specification. Six months is not allowed unless the patentee makes affidavit that he intends to take out patents for Ireland and Scotland in addition to the grant for England; at the same time, as is generally the case, the party applying has no such intention.

Another great inconvenience consists in the parties being obliged to attend *personally* to acknowledge their specifications.

The appointment of a commission for the decision of all questions relating to patents was a favourite notion of Mr. Millington's many years ago. He thought that commissioners might be appointed from among the most eminent men in the country in different branches, taking one set of men for chemistry, and another for mechanics, and another for agriculture, and so on. Instead of going through the present non-efficient and tedious process, it might be referred at once to the commissioners, who might be paid in the manner of commissioners of bankrupts, a moderate fee, enough to make the business worth their attention, and that they should declare whether the patent is fit to be passed or not. As this would increase the expense of the patent, the stamp duty might be diminished, and a greater revenue might be obtained by a stamp duty on the articles sold instead of upon the original patent. As the matter now stands, whether a man makes not a penny by his patent, or he obtains an immense fortune, the country gets no advantage by it. On the contrary, if an *ad valorem* duty could be devised, so that the man who made nothing by his patent should merely sustain the expense of procuring the grant, and he who should make a large fortune by it, should contribute a portion of that fortune to the state, it might be advantageous. There seemed, however, to be a great doubt as to the possibility of obtaining commissioners, or of getting the duty performed in an efficient manner without partiality or prejudice. In trials upon disputed patents, parties are often put to enormous expenses in order to explain their inventions to an incompetent jury, it being common to subpœna all the principal engineers in town, the expense and inconvenience of which would be entirely avoided if competent commissioners were appointed. A patentee would, under a commission, have a greater chance of losing his patent if it did not deserve to stand, and a greater chance of maintaining it if it did. Mr. Millington did not think the expense of a patent an evil, provided the patent were a secure property; if patents were granted at too cheap a rate, the world would be inundated with them. Thought the patent should extend to the "*entire dominion.*"

In the drawing of specifications there are two difficulties to contend with—the one is, not to describe that what the pro-

perty of the public before, and which requires a very general knowledge of that which has existed; the other is, to describe the thing so clearly that every competent workman may be able to carry into effect. As the law of patent at present stands, it does not appear that there is any protection of patent property in the East India possessions; they do not appear to be included in the colonies. An instance of an application to extend a patent right to the East Indies for an invention that would be particularly useful there, was mentioned by Mr. Millington, who took several legal opinions for the patentee as to the course to be pursued to enable him to benefit by its introduction into India; and it was finally proposed to be done by an office copy made here, and transmitted through the medium of the East-India Company to their presidences, a process, which, as it must of course be attended with considerable expense, trouble, and delay, should be remedied, by including the Indian possessions in the grant, that is to say, the "entire dominion."

Mr. Millington also considered that the patentee should have the privilege of examining the roll, after the enrolment of the specification, to ascertain its correctness, as it sometimes happened from the ignorance of the copying clerks in the scientific and technical phrases they were rendered unintelligible from misconception and mis-spelling.

MR. POOLE, *of the Attorney General's Office, being called in and examined,*

said, in reply to the interrogations of the Committee, that he did not see any defect in the present law; he admitted that great delays arose in obtaining the King's signature, which it was desirable to remedy; had known of patents being lost from the length of time that elapsed before obtaining the seal, during which the inventions became known. He once procured a patent in fourteen days for Sir William Congreve: the shortest time he could now say would be six weeks.

With respect to caveats, Mr. Poole said, that they merely served as notices to the parties entering them that other applications were being made for a similar object. After receiving such notice, the caveatee must determine, within seven days, whether he will oppose the new applicant in his invention; in which case both parties are heard before the Attorney General, who decides whether a patent shall be issued to the new applicant or not. When the priority of the opposing parties in a new invention cannot be determined, the grant is refused to both, unless they will agree to an union of their interests. Thus, to a certain extent, the caveat affords useful protection against piracy.

Have you ever had to prosecute a caveat before the Attorney General?—Nearly every week. I had two last Saturday; and I have appointments this week.

Does the Attorney General ever call in the assistance of a scientific person to assist him in his judgment ?—I never knew it done.

Suppose the Attorney General is not himself acquainted with mechanics or chemistry, what means has he of deciding between the claim of the two ?—They are generally very minute in the examination when they find any difficulty; they see the party time after time until they are quite acquainted with it. Sometimes they go in three or four times; sometimes they take a month to consider of it. I have one now which has been standing over three months.

During the time that the question is considering before the Attorney General, is the applicant for the patent secure ?—No.

During all that time he is exposed to have his invention published ?—Yes.

It is the practice, is it not, for many parties who have patents still to maintain a caveat ?—I recommend them for all the fourteen years.

For what purpose ?—To prevent others from taking the patent for the same object. If a person applies for a patent, the patentee has the option of sending the party applying to the Inrolment Office, where the specification is lodged, and desiring him to read over his specification.

Do you conceive there is any advantage in separating the grants of the patent for England, Scotland, and Ireland ?—If a patent were to include the United Kingdom, I think there would be a great disadvantage to those inventors who are obliged to commit the making of models or drawings to others, as instances have occurred where the workman has either himself pirated the invention, or inadvertently or designedly made it known to others, in which case the only remedy open to the inventor is to make the best of his invention in the other two kingdoms, he having lost all his chance in the one where it has become published, prior to his having taken his patent.

Do you conceive there is any inconvenience, as to cost, in taking out the patent at present ?—I do not think it is too dear.

What is the whole expense ?—About £360 the three kingdoms, if with a short specification, and no opposition.

What advantage do you conceive is derived to the public in making the price of the patent so high ?—It prevents patents being taken out for too trifling objects.

What inconvenience do you think would result, if patents were to become more numerous, and they were to be taken out for trifling inventions ?—It would be, I think, to the injury of the common tradesman. A patent is an exclusive right to the vending of a certain article, and of course the patentee has a privilege over the rest in the same trade; if he gets that privilege too cheap, it would be to the injury of other tradesmen in the same line.

If he makes an useful discovery, why should he not derive the

benefit from it?—The privilege is so great, when the thing is worth any thing at all, he ought to pay for it.

Do you think where an invention was of trifling importance, it might be desirable to allow a person to take out a patent for a shorter period, say for five years?—I should say not; I have heard no objection to the term of fourteen years by any person.

Are there not many trifling inventions for which the term of fourteen years is too long?—I should think not.

Are you aware of the patent that was taken out for the kaleidescope?—I am; that was lost, not in consequence of time, but in consequence of exposing it before the patent was sealed.

Would a patent for fourteen years, for an invention of that sort be desirable?—I should see no objection to it.

Might not the inventor of it see an objection to taking out a patent for so long a period at the present expense; would not it have been much more convenient for the inventor to take out a patent for five years, at a less expense?—I think it might be so; but I think that most persons would rather pay a larger sum and have it for fourteen years, than pay a smaller sum and have it for five years.

If your objection to diminishing the expense is that it would make the benefit derived from the patent more than commensurate to the expense of it, would not it in some degree be met by diminishing the advantage derived from it, which would be done by shortening the period for which the patent would last?—It might be.

What office do you hold in connection with patents?—I am a clerk in the Patent Office by the appointment of the Attorney General.

Is that appointment a permanent one?—It is considered so; I have a written appointment from the Attorney General; Sir Samuel Shepherd gave it me when my father died, who was in the office for thirty-six years before that period.

Are the specifications inrolled in that office?—They are not; there is the Inrolment Office, and the Rolls Chapel, and the Petty Bag Office for inrolling them.

What are the duties of the Patent Office?—The Attorney General receives the King's warrant, and prepares the bill for the patent, prepares the transcripts, and sends them on to the Signet Office and Privy Seal Office.

Have you the custody of any of the deeds?—Mr. Dealtry, who is clerk of the patents, keeps all the warrants for the Attorney General.

You are aware that the original specification is returned to the party after it has been copied and inrolled?—I am.

Can that original specification be made evidence in a court of law?—I apprehend not, for this reason, we have the specification out, and should there be any defect in it, the party might alter it, and say it was the correct state of it at first.

Do you see any objection to allowing the original specification to be made good evidence in a court of law, on proof that it had been verified with the inrolled specification?—I see none.

Can that be done at present?—No, it must be an official copy?

Does not that add, in some cases, considerably to the expense of the trial?—Much, where the drawings are expensive.

Do you know any cases in which the original rolls have been produced?—In any cases it is allowed upon paying the clerk for carrying it up; I think it is two guineas.

Has not there been a rule lately made by the Master of the Rolls, that the original roll shall not be produced, except in very special cases?—It is always done by petition; I never knew it refused.

Do you believe the present practice to be, that the original roll is taken out of the Rolls Office and carried to Westminster Hall?—By the clerk who has the custody of it, upon petition to the Master of the Rolls to allow it.

Do you conceive that that permission is granted as a matter of course, or only under very special circumstances?—I have considered it a matter of course.

You are not aware then that a rule has been lately made by the Master of the Rolls, which forbids the removing of the rolls, except under very special circumstance?—I am not.

Do you not conceive that it is objectionable to remove the original records; are they not exposed to the danger of being lost or injured?—There is the chance of miscopying, and that I should think would be the principal ground of wishing the original roll to be produced.

Must not any danger of miscopying be obviated by having the copy verified?—I think it would be.

Is not that always insisted upon?—The parties may examine it; but it is usually examined by the clerk and the parties that engross it.

Do you see any objection to amending the law, so that a person should be enabled at once to take out a patent for the three kingdoms, at perhaps the same expense that he has now to pay for taking it out for England alone?—I see none; there would be this difficulty perhaps, that there are certain officers in the different countries that depend upon the progress of the patent for their emoluments; but that does not concern the patents themselves.

Is there much expense attending the inspection of specifications?—It is 1*s*. if you know the date of it at the Inrolment Office, and 3*s*. 6*d*. at the Petty Bag and Rolls Chapel.

You are aware that in some of the public journals an account of the specifications is published?—I am.

Do you conceive that all the specifications are published in those journals?—I do not.

Do you conceive that it would be advantageous to have a complete list of those specifications published in any public journal or

gazette?—I have never given that much thought; but I should think it would not be so desirable; it has been supposed to give those persons who are anxious to evade the patent an opportunity of doing so; there have been several high opinions against it; I think the late Lord Ellenborough was opposed to it, and Lord Eldon.

Do you see any inconvenience in the time that is now given for inrolling the specification?—None; the only one is keeping the public in a state of suspense for the time.

Do you conceive that two months is sufficient time?—It depends upon the extent of the invention; some require twelve months.

Can you suggest any improvement in the present practice?—Nothing, but that I think a patent should be quicker obtained, and the patentee secured from the commencement.

But you have no objection to the present expense?—No; I have known them to get £130,000 by a patent; they all run the risk of losing by it, and those who get so much, pay no more than those who lose by it.

You have stated that there is great uncertainty in maintaining a patent?—I have.

Have you considered any means of rendering them more secure?—I have not considered any other means, except that of making them safe on the first application, and that after that, unless it could be proved that the thing had been practised before, the patent should be valid.

Do you think it would be desirable, in case of a patent being contested, to give the Attorney General the power of calling in the assistance of some scientific man?—I think it would, if they were on oath, that they should take no advantage of the information communicated to them.

Have you ever been concerned in obtaining the extension of patent rights?—Never.

What is the longest term you have known given for putting in a specification?—I obtained fifteen months for Colonel D'Arcy some time ago, as the legatee of Mr. Broderick, for putting in a specification; we have had two years sometimes.

Is not that length of time very inconvenient?—It is to the public.

Have you ever known a patent lost, from a disclosure being made by the servants of the applicant who had been engaged in making experiments?—Not exactly.

Do you think it would be desirable to adopt the course which has been suggested, that upon an application made to the proper authorities, the discovery should be made secure to the applicant till the issue of his patent, but that at the issue of his patent it should contain a specification?—It might be desirable.

Do you see any objection to it, provided the property of the inventor in his discovery was secured to him in the interval between the application and the issue of the patent?—I see none; but I think there might be objections to it which I do not see at

present; perhaps lodging a skeleton specification first, and then afterwards making it up, would be desirable.

The proposal which has been made is, that upon application for a patent, the applicant should give the principal points of his invention without describing it in detail, but sufficient to mark the particular character of his invention, and that he should be secured of the property to that invention in the interval between his application and the issue of his patent; and that before the issue of his patent he should prepare his specification?—I think it might be a good plan.

Can you furnish the Committee with a detailed statement of the expense incurred at each of the offices in taking out a patent?—I have prepared a statement of the expense, which I will deliver in.

PATENT FOR ENGLAND.

STAMPS £.	s.	d.			£.	s.	d.	£.	s.	d.
			Secretary of State's:							
				Reference -	2	2	6			
				Warrant -	7	13	6			
				Bill - -	7	13	6			
								17	9	6
6	-	-	Mr. Attorney General:							
				Report -	4	4	-			
				Bill - -	15	16	-			
								20	-	-
			Signet Office:	Fees - -	3	1	-			
				Gratuity -	1	1	-			
				Office-keeper	-	5	-			
								4	7	-
			Privy Seal:	Fees - -	2	16	-			
				Gratuity -	1	1	-			
				Office-keeper	-	5	-			
								4	2	-
			Great Seal Office:							
30	2	-		Fees - -	5	17	8			
				Stamps -	30	2	-			
				Boxes - -	-	9	6			
				Gratuity -	2	2	-			
				Hanaper -	7	13	6			
				Deputy - -	-	10	6			
				Recipi - -	1	11	6			
				Sealers -	-	10	6			
				Office-keeper	-	5	-			
								49	2	2
			Passing the Patent - - - -					10	10	-
			Letters, &c. - - - - - - -					1	1	-
5	-	-	Specification according to its length.							
£.41	2	-					£.	106	11	8*

* By comparing the above amount of 106*l.* 11*s.* 8*d.* by the actual charges made by Mr. Poole himself, we find it to be about twelve pounds, that is 118*l.*

SCOTCH PATENT.

STAMPS.			£.	s.	d.	£	s.	d.
	Secretary of State :							
		Reference -	2	2	6			
		Warrant -	15	7	-			
£. s. d.		Stamp -	1	10	-			
1 10 -	Lord Advocates :					18	19	6
		Report - -	-	-	-	4	4	-
		Director -	15	-	-			
		Clerk - -	7	10	-			
		Translator -	1	1	-			
		Director -	1	1	-			
		Servant -	-	2	6			
		Livery - -	-	3	7½			
		Extra - -	-	2	6			
						25	-	7½
	Great Seal :	Lord keeper	6	13	4			
		Deputy - -	2	10	-			
		Usher - -	2	4	5½			
		Appendee -	2	2	-			
		Deputy -	1	1	-			
		Wax - -	-	7	6			
		Extra - -	-	2	6			
		Agent - -	4	4	-			
						19	4	9½
	Passing Patent - - - - - - -					10	10	-
	Letters - - - - - - - - -					1	11	6
5 - -	Specification according to length							
£.6 10 -					£.	79	10	5

IRISH PATENT.

STAMPS.			£.	s.	d.	£.	s.	d.
£. s. d	Secretary of State's :							
		Reference -	2	2	6			
1 10 -		Warrant -	7	13	6			
		Stamp - -	1	10	-			
						11	6	-
	Mr. Attorney General and Solicitor General's Report - - - - - -					31	10	-
	Paid entering at Signet Office - -					3	3	-
	Paid ditto at Seal Office - - -					2	14	6
	Lord Lieutenant for fiat - -					5	5	-
	Mr. Attorney General and Clerk for fiat -					11	-	3
	Clerk of the Hanaper - - - - -					8	9	2
	Stamp to the Grant - - - - -					21	13	4
23 13 4	Inrolling - - - - - - - -					1	1	8
	Further Fees paid in Ireland - - -					21	2	6
*1 - -	Passing the Patent - - - - -					10	10	-
	Letters - - - - - - - -					-	10	6
£26 3 4					£.	128	5	11

* Stamp to Specification.

What is the additional expense of a patent for the colonies?—The expense for the colonies is about £5 additional.

Have you ever been engaged in any law-suits for the maintenance of parents?—Never.

Do you know the grounds upon which they are usually set aside?—I have hardly ever been in court when they have been tried, but I have heard the reasons; they are generally for want of novelty, or else a bad title.

MISCELLANEOUS.

Pulmonary Consumption.—The "Globe" states that a student of medicine twenty-six years of age, attacked by a malady which one of the commissioners appointed by the Académie des Sciences recognised to be pulmonary consumption, had been completely cured by the administration of chlore.

Volcano.—A short time ago, a species of volcanic mountain was discovered in the environs of Sarrebruck, Prussia. It is in the form of rather an irregular cone, of six or eight hundred feet in height, and covered with wood, except towards the summit, where there is no vegetation but moss. The heat of the soil increases gradually towards the summit; from whence issues, through a small crater of thirty feet, such warm steam, that an egg may be boiled by it in a few minutes.

Grease Spots.—The following method of removing grease and oil from silk and other articles, without injury to the colours, is given in the "Journal des Connaissances Usuelles:"—Take the yolk of an egg and put a little of it on the spot, then place over it a piece of white linen, and wet it with boiling water: rub the linen with the hand, and repeat the process three or four times, at each time applying fresh boiling water; the linen is to be then removed, and the part thus treated is to be washed with clean cold water.

On Mixtures of Wheat Flour.—Several varieties of flour having been submitted to M. Henri, for examination, in order to discover the presence of potatoe flour. By means of a good lens, he found it easy to distinguish the brilliant crystals of the starch, but as that did not afford him the means of estimating the proportions of the mixture, he proceeded to ascertain the quantity of gluten yielded by these specimens of flour, taking, as a standard of comparison untouched flour, prepared under his own observation. Of twenty-five specimens of pure flour made from corn of 1827 and 1828, was obtained as a mean result, 10¼ per cent. of perfectly dry and pulveralent gluten, whilst the flour announced as mixed, gave only from 6 to 6½ per cent. of perfectly dry gluten. Hence it will be easy, by the simple operation of extracting the gluten, to prove whether flour be be mixed, and to what extent.

Languages in America.—11,647,000 persons speak English; 10,584,000 Spanish, 7,593,000 Indian: 3,740,000 Portuguese; 1,242,000 French; 219,000 Dutch, Danish, and Swedish.

PATENT IMPROVEMENTS IN BLOCK PRINTING.

By JOHN APPLEGARTH, of Crayford, Kent, 1829.

THE improvements for which this patent has been granted, are produced by an apparatus, which will facilitate the accurate arrangement of the square blocks employed in calico-printing when used successively for the continuation of a given pattern. This apparatus is composed of two principal divisions, the first being of the nature of a table or stand, on which the calico, or other stuff required to be printed, is to be laid to receive the impression of the blocks, and the second consisting of a frame that fulfils the chief purpose of the object of the patent. The table, or stand, is made of horizontal stone slabs, a little exceeding the breadth of the stuff, and of the same length, being intended for printing handkerchiefs or shawls. These slabs are placed successively in one line, within about an inch of each other, on parallel brick walls, of between two and three feet in height, and over them a thick piece of blanket, or other proper woollen stuff, is laid, which is either nailed to pieces of wood fixed beneath the intervals between the stone slabs, or is kept down by metal rods placed across in the same intervals, and passed through staples secured to the walls at each of their ends. A frame is then prepared to lay over this table, containing as many square compartments as there are slabs, which is fastened at one side of the table to hinges, that project from each of the supporting walls for that purpose, which allows the frame either to lie horizontally in close contact with the slabs, or to be raised up vertically when the calico, or other stuff is being laid on the slabs, or removed from them. At one extremity of this table of slabs a row of tenter hooks is placed across, to which one end of the piece to be printed is fixed, and it is then laid evenly over the slabs, and fastened down in the intervals between them by the rods passed through the staples before mentioned, after its farther end is drawn tight by means of a cross bit of wood to, which it is attached by a similar row of tenter hooks, that is either fastened to the other end of the table by cords, or is drawn towards that end by weights attached to the extremities of the same cords. Supposing the calico or other stuff to be arranged and fastened down evenly over the table of slabs, and the frame to be let down horizontally, in contact with its surface, a block is then to be taken, having a fourth of the area of one of the square compartments of the frame, on which the pattern preferred has been cut, so that the joinings of the figure may fit accurately, on shifting its position; and the colour having been applied to its face, either by dipping it on the colour sieve, or by colour rollers, it is then to be pressed down by a blow or other means, in one corner of the first square compartment of the frame, then in the next corner, and so on successively through the other remaining corners, care being taken to keep the proper angle of the block next the corners of the compartment; one handkerchief or shawl being thus stamped, the same process is to be repeated in all the other compartments of the frame, until the whole piece is completed. When a medallion, or other central figure, is to be im-

pressed on the middle of the handkerchief or shawl, then a moveable frame is to be formed of four pieces of wood, of the length of one of the compartments, crossed so over each other (by dividing the joinings) as when laid in the compartment, to divide its area into nine equal squares; in the central square of these, a block, having the whole of the intended medallion, or other figure, cut on its face, is then to be stamped in the manner before described; or a block, having a quarter of the same figure cut on it (and, of course, only fourth of the area of the central square,) may be used, and the impression be made of the whole figure by four successive operations, in the same way as with the larger blocks in the process first recited. When only a border is to be stamped on a shawl or handkerchief, the patentee directs that a block of another shape be used, which is to be of the breadth of the intended border, and of such a length as to extend from one angle of the square compartment of the guiding frame to within a distance equal to its breadth, of the adjoining angle, and the pattern proper for the angle of the border, having been cut at the end of the block, placed in the first instance close to the angle of the square compartment; at the next transfer, that end of the block is to be laid in the space left at the extremity of the first impression, where it will form the second angle of the border; and the block being applied successively at the other sides of the compartment in the same manner, will, at the fourth impression, complete the border.

POOLE'S PATENT STEAM-BOAT PADDLES.

We may congratulate our readers and the public that an apparatus has at length been not merely devised, but brought extensively into actual and beneficial operation, by which the inconvenience and waste of power, attending the use of the common paddle-wheel are completely obviated. Unlike the generality of its predecessors in this branch of mechanical invention, the combination of parts is of the utmost simplicity, and such as to introduce so very little additional friction, that it cannot fail of realizing those important advantages to steam navigation, which theory has long shown to be a desideratum in mechanics. The gentleman who has favored us with the annexed communication renders it unnecessary for us to say more in this place on the subject.

To the Editor of the Register of Arts.

Sir,—Numerous have been the descriptions given by you since the commencement of your very useful publication, of patented and other methods for an improved mode of propelling steam vessels through the water. Having paid very particular attention to whatever has appeared on that head, I think I may venture to say (notwithstanding many of the newly invented paddle wheels have been highly praised by some of our first mechanicians, as combining all which was necessary to effect the purpose required) that to this time, there are none that have answered the expectations entertained of

them; *nor is there one in actual and beneficial practice;* a sufficient proof of the entire failure up to this period. Still by the frequent dissertations you have given on the defects of the radial paddles, and the nature of the remedies to correct them, the mechanical mind of the country has been so directed to the consideration of the subject, that I doubt not the difficulties will ere long be solved, and a means of navigating by steam, without injury to the banks, be afforded to the principal rivers and canals of the kingdom.

The object of this communication is chiefly to introduce to your notice, and thereby to the public, another candidate for an improved paddle wheel, in a Mr. Poole, a smith of this town, who is possessed of considerable mechanical invention, and is also a superior operative, and to whom I have frequently made known whatever has been offered to the public on this subject, either in models, or attempts in practice. Mr. Poole has recently patented his invention, and I believe it will be found to surpass every other of the same kind, hitherto offered to the public. That you may be the better enabled to describe his new wheel, satisfactorily to your numerous readers, he herewith sends you his model, made on a scale of an inch to a foot; and of which you will find the following to be among its principal features. The wheel is a common one, to be suited to the size of the vessel it may be designed for, except that the float or paddle is not fixed to the radii, but vibrates on its axis in the rims of the wheel. On the side of the vessel, is placed, *very securely*, two concentric circles of iron, placed vertically edgeways, with a space of about one inch and a half between them, forming thereby, what may be called a rail-road, on the side of the vessel for a guide-pin, fixed on the end of a lever, attached to the paddle axle to travel in. The concentric circles before mentioned, are placed *excentric* to the axle of the wheel, and the paddles are thereby carried round, so as to enter and leave the water in such angles as to avoid the splash at entering and the lift at coming out. This wheel allows advantageously of a deeper immersion in the water, than the radial paddle, obtaining a greater power by being brought to a leverage on a denser medium than the surface water, and thereby adding most materially to the propelling power of the wheel: it is equally efficacious in its back stroke. It should seem however that one third of the diameter of the wheel, from present experience, is the best dip, and as this may allow of the lowering of the main axle, and probably the reducing of the wheel, in consequence of the greater extent of paddle surface, that can be employed, the paddle boxes may be considerably lowered. The angle formed by Mr. Poole's arrangement, we know has been obtained before by Mr. Steenstrup, Mr. Oldham, and others; but it has hitherto been the result of intricate trains of wheels, endless chains, &c. &c.; the expence of making which, the loss by friction, the liability to injury, and the difficulty of reparation in complex machinery, are very sufficient reasons why their inventions have not been carried into practice. The same beneficial angle, however, is got by Mr. Poole's excentric rail-road, and is obtained by a mere lever connecting the paddle axis and the rail-road, which is traversed as the wheel is

driven round by a guide pin at right angles to the end of the lever; and to prevent the noise, which was found to proceed from friction wheels, pieces of thick sole leather, cut round with a hole in the centre, are kept upon the guide pin, and screwed together upon it, so tight and hard as to bear the friction of the rail-road circles, without injury, for a great length of time, and which quickly assume a hardness and polish with use, that will almost defy wear. I am well aware that models are very fallacious, and that they have often deceived the most knowing mechanics, when put into practice: I am therefore most happy, in being enabled to shew the effects of Mr. Poole's wheels in practice, as they have been placed in succession on three different steam packets, that are regularly plying between Lincoln and Boston, a distance of more than 31 miles, on one of them for a period of five months; the particulars of which, with the size of the boats, &c. are given below, and the new wheels are certainly effecting much more than has hitherto been obtained by any other; and when they can be used with a different description of boat, in which *the condensing engines must give way to the superior high pressure engines, and patent tube boilers* of Mr. W. H. James, (which I have had the pleasure of seeing on board their "Safety Steam Boat," at Vauxhall, and which I believe to be *decidedly superior* to any other hitherto offered to the public, both for *security against accident*, as well as *lightness with power*,) many of the objections at present existing against the introduction of steam navigation on rivers and canals must be removed. This being a subject in which I am much interested, (being one of the Committee of Management of the River Witham, who are most anxious to give every facility in their power to steam vessels navigating the Witham, though they are compelled from the present structure of the vessels to limit the rate of speed to 4½ miles per hour in the first nine miles from Lincoln; for fear of injury to the banks, in consequence of the reduced scale of that part of the river.

Description of Steam Vessels navigating the River Witham.

Names of Packets, and when Poole's New Wheels were attached thereto.	Length of Keel.	Width of Beam.	Horses' Power of Engine.	Draught of Water when light.		Dead Weight of Engine, Machinery, Boiler, and Water therein.	Average Speed with Old Paddles.	Average Speed with New Paddles.	Consumption of Coals with Old Paddles.	Consumption of Coals with New Paddles.
	Ft.	Ft.		Ft.	In.	Tons.	Miles	Miles	Bush.	Bush.
Favorite, July 27, 1829.	67	10½	8	2	8	9	5	6	40	32
Countess of Warwick, Sep. 22.	68	10	10	3	8	11	5	6	40	32
The Witham, Dec. 6.	74	12	9	3	3	13	4½	5½	48	40

N. B. The average speed in the above table must not be looked upon as what *only* can be accomplished, the *limit of speed* before

mentioned being the occasion of it. In the lower part of the river, where the width is from 90 to 100 feet at surface, and 7 feet to 10 deep, the *Countess of Warwick* can go *eight miles* per hour, well, *on still water.* The *Witham*, when put down by loading to four feet, which she has been, goes surprisingly better; thereby showing the advantage derived by a deeper leverage. The consumption of coals stated, is in going down to Boston one day, and returning the next.

I have formed a plan for an improved Steam Vessel, better suited to such rivers, and which when more matured, I will with your leave, communicate for insertion in some of your future numbers.

I remain, sir, your most obedient servant,

Lincoln Castle, JOHN MERRYWEATHER.
Dec. 24, 1829.

With the foregoing communication we received a model of the apparatus, of which we have made a sketch in perspective, as represented by fig. 5, (Plate 12.) *a b c d e f*, are the paddles which turn round upon their axes as the large wheel to which they are applied revolves. *h h h h h h*, are tie rods to the two sides of the wheel. *i i i i*, are the concentric rings, with an opening or groove between them, which forms the path or railway for the cranked arms, *k k k*, to travel in. The centre of the guide rings or railway being excentric to that of the wheel, causes the paddles to assume the positions represented, which are found to be best adapted to the motion of the vessel. The paddle *c* is supposed to be just dipping into the water, while *d* is deeply immersed, and *e* is just emerging from the water.

Fig. 6, shews an underside perspective view of a paddle separately, with its axis, *a*, its crank arm, *k*, and its anti-friction roller, *l*, which runs within the circular groove of the railway, *i i*.

N.B. We have been requested by the patentee to send the model of this wheel when we have done with it, to the National Repository, at Charing Cross, for public exhibition; where it will be to be seen as soon as that establishment re-opens for the next season.

IMPROVED DRAWING COMPASSES.

To the Editor.

SIR,—Inventors may be sometimes accused of presumption and self confidence, when they propose an alteration in any instrument or machine in actual use; hence, they ought to deem this alteration an improvement, in order to vindicate their conduct in giving them publicity. Now such a charge may be brought against the author of the following proposed compass; yet he ventures on the probability of success, to subject himself to the possibility of such a charge.

The drawing scarce requires any explanation; yet the following will remove a doubt of its being perfectly understood. *a*, fig. 3, (plate 12.) is an arc of which the hinge of the compass is the centre,

on its edge are cut conical teeth a little diagonally; *b*, is a screw, with corresponding threads, fixed to which is a pivot, running through the leg of the compass, with a milled head at the end; the end of the arc turns on centre *d*, and is allowed a little play in both legs; *c*, is a spring, which keeps it in geer against screw *b*; should it be required to move the legs any distance, the arc should be pressed upwards out of geer, and the legs moved by hand as nicely as possible, the arc may then be allowed to move into its place; if the compasses are now set sufficiently exact they are immoveable to any presure on the points; but if not by turning the screw *b*, the points of the compass may be adjusted to an hair.

In order to show that this is an improvement upon the compasses actually in use, it will be necessary to mention their peculiarities:—The two most universally used, when nice adjustmeut is required, are; 1st. that with a spring instead of an hinge, the legs of which have a tendency to expand, and are moved together by a screw, similar to a hand vice. 2nd. that which has a pinion in the leg, working in teeth cut in an arc, whose centre is the hinge of the compass as before. The former of these have this disadvantage attending its use, that should it be desired, as it often must be, to move the legs any distance, the tedious operation of screwing or unscrewing must be used throughout, when set, though no pressure to which they are liable can make them expand, yet should the spring be not very stiff, the legs are liable to be drawn together. The objection to the latter, is, that they cannot be set so delicately; and when set, a second process is necessary; another movement is required, that of turning a screw to join the arc. The accidents arising from the use of the simple compass with a tight joint, when for instance in describing a circle, the extremities of the curve do not meet, might lead a novice in its use, to flatter himself with the hope that he had made some wonderful discovery in the simple property of the circle, or almost lead him to suppose that the mathematical definition of it was false, and at length vexed, throw down this long tolerated instrument, and exclaim, that it is impossible "to describe a circle from any centre, at any distance from that centre."

Queen's College, Cambridge, Your's, &c.
Dec. 23, 1829, C. S.

THE PATENT HARP-VENTURA.

Invented by Signor Ventura, of 48, Cirencester Place, Portland Place.

Having been highly gratified by hearing this beautiful little instrument played by the able professor, who is the inventor of it, at the National Repository (Charing Cross); we are naturally desirous that those of our readers who have not experienced its delightful harmony, should have an opportunity of becoming somewhat acquainted with it, through the medium of our columns. With that view we annex a representation of it in the margin. The size is

33 inches long, and 14 inches broad; it has 17 strings, and is of an elegant design and appearance. It may be considered as a modification of the harp and guitar, (combining the tones of both those instruments) while it is as portable as the latter. By a mechanical arrangement of g reatingenuity, nearly similar in its effects to the pedal action of a grand harp, this instrument is put into any key, which is effected by the pressure of the left thumb on a spring; by means of which, the flat or sharp is immediately produced; consequently a key of 4 or 5 flats or sharps may be readily adjusted, and performed in, with the same facility as that of the natural key, much labour is thereby obviated in the performance, and a knowledge of the instrument is very soon acquired. Its compass is rather more than three octaves and a half, commencing with the G below the stave in the treble clef. It is productive of a very fine quality of tone; approximating to those of the harp in the lower notes, and to the guitar in the upper; it also harmonises beautifully as an accompaniment to the voice.

PORTABLE BELLOWS.

SIR,—Should you deem the following contrivance worthy of notice, or likely to tend to any benefit, I shall be satisfied in having it placed under the covers of your useful circulating repositary of inventions.

I have called it a contrivance, of no new principle I am aware, but of a new arrangement; in fact I have made this wind instrument a stepping stone from the domestic hand, to the powerful forge bellows: it may be applied to the former purpose with great advantage, especially for the purpose of getting up a fire for roasting in a few minutes; and to the latter, in the same state, to produce a blast of sufficient strength to work a bar of iron of an inch diameter. It may be asked of what dimensions should this bellows be, of which a drawing and description is annexed, and to which the above effects have been ascribed.

The three planks are 15 inches square; being a double bellows it is suspended by the middle plank, to a frame 11 inches high; when expanded it is 13 inches deep; the valves are 2½ inches square; the large end of the pipe is 1 inch by 1½ inch, being oblong, and the small orifice is ¼ in diameter, round; this is the size that repeated trials have proved to be most adapted to a common fireplace, in order to expand the flame over the whole grate; but for a more contracted body of fuel, as in a forge, it should be reduced in size proportionably. The weight on the upper board, which is used as in the ordinary bellows, for preserving a combined blast, may be from 8 to 16 lb. and upwards. When used as a bellows for a blow-pipe, to which purpose I

think it is very applicable, it should be placed underneath a table, with the pipe on the opposite side, and the bend in the small pipe should be at right angles, so as to blow the flame towards the operator, as shewn in the description.

a, fig. 1, (Plate 12.) is the bellows, suspended by the middle board, to the upper ends of the legs of the frame; *b b b*, are the three boards; *c*, the treddle; *d*, a piece which is forked, so that it may not interfere with the valve; *e*, the fulcrum placed an inch within the bar connecting the legs on this side; *f f*, are brackets, fixed diagonally on the bottom board, and groved, to fit the edge of the legs of frame, to preserve a vertical ascent and descent in working; *g*, is the weight, kept in this position by a short pin fixed in centre of bellows, which fits a hole in the weight; *h*, is the pipe, composed of three joints, shewn separately by fig. 2; (Plate 12.); *k*, is a piece of wood joining the opposite rails, and projecting underneath the treddle, where it bears upon the ground, to prevent the apparatus from upsetting when worked; *l*, the part fixed to bellows; *m*, a bent piece which fits *l*, so as to slide up and down it, to elevate and depress the extremity, according to convenience; *n*, fits the extremity of *m* for ordinary purposes; when used as a blow-pipe, *n* fits on *l*, and a small piece, *o*, is attached to it.

Yours, &c.

Queen's College, Cambridge, C. S.
December 24, 1829.

LIST OF NEW PATENTS SEALED.

SHARPENING KNIVES.—To F. Westby, of Leicester, for an improved apparatus for sharpening edged instruments.—Dated 26th November, 1829.—Two months to enrol.

EXTRACT OF COCOA.—To J. Marshall, of Southampton Street, Strand, for a mode of preparing an extract of cocoa.—Dated 10th December, 1829.—Two months.

SUGAR AND STARCH.—To B. Goulson, of Pendleton, near Manchester, for improvements in the preparation of farina and sugar from various vegetable matter.—Dated 14th December, 1829.—Six months.

MANUFACTURING SUGAR.—To C. Derosne, of Leicester Square, for improvements in extracting sugar from the cane, and in refining the same.—Dated 14th December, 1829.—Two months.

TO OUR READERS AND CORRESPONDENTS.

In reply to A Working Mechanic, we beg to inform him that the "*Old Series*" of this work may be had of the Publisher through the medium of any Bookseller, with the deficiency of two numbers. With respect to the enquiry about a certain steam apparatus, there can be no valid patent for the application of a forcing or an exhausting air apparatus, such applications being of 30 years standing, as will be found on reference to the account of the furnaces for the consumption of smoke, in this work: and we are of opinion that there is no novelty in any part of the machine.

We have to thank A. M. M. for his obliging letter, but the suggestion it contains has been repeatedly proposed, and in some instances acted upon.

DESCRIPTIVE ACCOUNT OF ALL THE

PATENTS ENROLLED BETWEEN 20TH DECEMBER, 1829, AND 20TH JANUARY, 1830.

Particularizing the Offices in which the Specifications may be inspected, with the Dates of Enrolment.

STEAM-ENGINE AND PROPELLING.—To Elijah Galloway, of King Street, Southwark, a patent for "certain improvements in steam-engines, and in machinery for propelling vessels, which improvements are applicable to other purposes," was granted on the 2d of July, 1829, and the specification was deposited in the Enrolment Office on the 2d of January, 1830.

The improvements in the steam-engine here contemplated, consist of arrangements, by which a continuous rotatory motion is obtained from the alternating circular motion of a piston or flap vibrating within a hollow cylinder on an axis coincident with the axis of the cylinder. The piston in this instance is a rectangular flap, whose length is equal to the interior length, and its breadth equal to the radius of the cylinder. Three sides of the piston are made to fit the interior of the cylinder steam tight, by metallic or other packing, and the fourth side is attached to an axis with which it vibrates, making about three-fourths of a revolution at each vibration. It is scarcely necessary to remark here, that the steam is admitted on the opposite sides of the piston alternately through the medium of a two-way cock, or shifting valve, acted upon by the motion of the apparatus.

The force of the steam thus exerted upon the piston is transmitted to a fly-wheel, and thence to any required purpose in the following manner:—To one end of the piston axis, which is passed through the end of the cylinder, is fixed a crank, which, by acting in a longitudinal slit in the middle of a lever moving on a fixed pivot at one end, alternately elevates and depresses the other, and thus, through the medium of a connecting rod, communicates motion to the fly-wheel.

This engine, it will be perceived, is of the kind usually denominated rotatory, and it is not free from an objection common to all engines of this description, the difficulty of obtaining an efficient and lasting packing for a rectangular piston, while it is subject to the inconvenience of nearly as much alternating motion as the common engine.

Mr. Galloway's proposed improvement in machinery for propelling vessels has for its object a remedy for the loss of power,

and other inconveniences arising from the oblique position in which the float-boards of the common paddle-wheels enter and leave the water. This he proposes to effect by causing each float-board to turn, or rather vibrate on an axis at its edge next the centre of the paddle-wheel, through the medium of projecting levers firmly fixed to the float-boards at their axis of motion, and connecting rods proceeding from the extremities of these levers to the extremity of a fixed crank adjustable at a given distance from the centre of motion of the paddle-wheel, which consists of four radiating arms, connected at their extremities by strengthening braces.

The projecting levers or arms make with the float-boards angles of about 120 degrees, and thus the paddles or float-boards are made to enter and leave the water, deviating from the vertical only so much as is required to prevent the agitation of the water arising from the speed of the vessel.

The singular coincidence of Mr. Galloway's patent improvement in propelling apparatus, and Mr. King Williams's exhibition of a model of the same construction as his invention in the National Repository, we leave to these ingenious parties to explain.

PROPELLING.—To Jacob Perkins, of Fleet Street, London, engineer, a patent for "certain improvements in machinery for propelling steam vessels," was granted on the 2d of July, 1829, and the specification was deposited in the Enrolment Office on the 2d of January, 1830.

This patent, like the preceding, has for its object the saving of power and splashing of water; but the method here proposed is very different from that described by Mr. Galloway. Mr. Perkins places each of his paddles, consisting of a series of float-boards, on the extremity of a radiating arm, in such a position that its plane, if produced towards the centre of motion, would make with the axis of the paddle-wheel an angle of 45 degrees. The axes of the paddle-wheels are not carried across the vessel in the customary manner, but are carried in a direction sloping towards the stern, Plate XIV. figs. 1, 2, and they meet in a straight line drawn from stem to stern along the middle of the vessel, making with it an angle of 45 degrees, and with each other an angle of 90 degrees. On the extremities of the axis are fixed bevel wheels, which act upon each other, or are both acted upon by an intermediate bevel wheel in connexion with the steam-engine or first mover. Now, by this arrangement, the surface of each pad-

dle is perpendicular to the side of the vessel, or to the line of motion when immersed in the water at its greatest depth, and parallel to the line of motion, when at its greatest elevation, and presenting an angle of about 45 degrees, in the horizontal position, whether in the act of ascending or descending, and from this angle it deviates but little when in the act of entering or leaving the water, as the patentee proposes to immerse the wheel to about one-fourth its diameter.

At Plate XIII. fig. 5, is a diagram representing the outline of a vessel with these paddles attached. *a* the boat; *b b* the paddle axles, to which an uniform motion is given by the engine through the medium of the bevel gear which connects them; *c c* are two of the paddles immersed in the water, and in the act of propelling; *d d*, *e e*, and *f f*, are those paddles which succeed each other in the revolution. The oblique action of the blades of the paddles, as they perform their revolutions, will be more clearly understood by reference to fig. 5, wherein the paddles are marked by the same letters as in fig. 6, to which therefore the observations already made will apply.

By this method of causing the paddles to enter and leave the water, in an oblique position, it is presumed that the agitation will be very slight, and the consequent loss of power proportionally trifling: and it will be readily admitted that paddle wheels of this construction have the important advantage of being equally simple, a circumstance which will render them equally durable with those of the ordinary construction.

But while these advantages are admitted, it must not be forgotten that a considerable portion of the power employed is entirely lost in consequence of the oblique position in which the wheels are made to revolve.

This obliquity of position, if carried to the extreme, and there can be no maximum of effect obtainable by limiting it to 45, or any other number of degrees, would entirely prevent the agitation of the water at the very moment when the motion of the wheels would entirely cease to have any effect in propelling the vessel,

CORN MILLS.—To John M'Curdy, of Great James-street, Bedford-row, London, a patent for "certain improvements in the method of constructing mills, and mill stones for grinding," was granted on November 2, 1829, and the specification was deposited in the Enrolment Office on the 2nd of January, 1830.

These improvements, which are stated to have been communicated to the patentee by a foreigner residing abroad, consist: 1. In an arrangement by which the boulter, situated under the mill stones, is agitated by the same power which puts in motion the grinding apparatus: 2. In a method of readily adjusting the distance between the stones: 3. In a method of preparing or picking the stones by which the friction is to be diminished, and 4. In a composition by which imperfections in the mill-stones are to be repaired, or of which entire stones are to be formed.

The boulter is shaken by means of a projecting pin called a *tic-tac*, from the shaft on which the upper or moveable stone turns, coming in contact with a lever, to which the boulter is suspended. The boulter is a hollow cylindrical vessel, made of boulting cloth, wire, or other suitable material.

The vertical shaft which the upper stone turns in a socket, on the upper surface of a lever, which is hinged to a bearing at one end, and supported by a screw at the other, and by turning this screw the distance between the stones, and consequently the fineness of the grinding are to be regulated to any degree of nicety.

The friction is proposed to be diminished by cutting in the upper stone a series of grooves, about a quarter of an inch deep, proceeding from the centre, in a spiral direction to the circumference, and thus lessening the quantity of rubbing surface.

The composition which Mr. M'Curdy proposes to employ for repairing and making mill-stones, consists of a quantity of the French grit stone granulated, mixed with five times the quantity, pounded, and an equal quantity of alum, which are to be boiled together, and poured into the holes required to be filled up, if used for repairing stones, or into appropriate moulds if used for making new ones.

This patentee represents in the drawings annexed to his specification, a mill to be actuated by horse power, and one to be actuated by hand; and he claims amongst other things a mill with the stones placed vertically, but of this no description is furnished.

Piano Fortes.—To James Stewart, of George-street, Euston-square, London, Piano Forte Maker, a patent for "certain improvements on Piano Fortes," was granted on the 2d of November, 1829, and the specification was deposited in the Enrolment Office on the 2d of January, 1830.

This invention is applicable to the upright or cabinet piano fortes, and it has for its object a simplification of the parts by

which the action of the fingers on the keys is transmitted to the wires of the instrument.

There are several motions connected with the operations of a piano, which require great precision as to their time, duration, and intensity of action. The hammer must be made to strike the string at the same instant that the damper is withdrawn, and the hammer having done its duty, must be instantly removed (even before the finger of the performer has left the key), from the string to allow the vibration to take place, and then the damper must return to stop the vibration of the string the moment that the finger is removed from the key. Now as all the motions must be obtained by a very slight touch of the finger, and without any noise, the levers and connecting rods by which they are trasmitted from the keys to the strings become important considerations with the piano forte makers, and Mr. Stewart has simplified the action, and rendered it more certain by the introduction of a short lever placed over, and parallel with the interior end of the finger lever. This lever being short, and joined near its moveable end by a small connecting brass rod to the finger lever, furnished in itself the required variety of motions by placing the rods which act upon the hammer, damper, &c. at different distances from the fulcrum, on which it turns. In addition to this, Mr. Stewart has introduced an improved incline plane for receiving the tail of the hammer, and stopping it silently after it has struck the string.

AXLETREES.—To George King Sculthorpe, of Robert-street, Chelsea, Middlesex, Gentleman, a patent for "certain improvements in axles, or axletrees, and coach, or other springs," was granted on the 4th of July, 1829, and the specification was lodged in the Enrolment Office on the 4th of January, 1830.

The improvements in axles here contemplated, may be shortly described to consist in the employment for each wheel of a short axis, one end of which is to be firmly fixed into the nave, and the other to be formed conical and made to turn in bearings attached to a cross beam, or to the framing of the carriage, according to its construction. In connection with these bearings are placed oil vessels for keeping the rubbing parts well lubricated, and over the axis, between the bearings, is introduced a wedge, which, through the medium of a lever and chain, is pressed forward to retard the motion of the carriage when descending hills, or in cases of runaway horses, and the wedge is kept back, when not required, by a slight spring.

Mr. Sculthorpe's proposed improvement in carriage springs con-

sists in the application of a forked spring, of any required strength, to the interior of a hollow cone, to be made of cast iron, or other suitable material. The spring being forced into the cone, the sloping sides will compress the prongs, which, by their elasticity exerted against these inclined planes, will give the fork a tendency to return.

If this plan be investigated, it will be found to be simply an elastic wedge, which is one of the worst description of springs. on account of its want of stability, as well as on account of the great friction, arising from the quantity of rubbing to which its motions are subjected.

AXLETREES.—To Margaret Knowles, of Lavender Hill, Battersea, Surrey, Spinster, a patent for "an improvement in axletrees for, and mode of applying the same to carriages," was granted on the 4th of July, 1829, and the specification was deposited in the Enrolment Office on the 4th of January, 1830.

This invention is intended to improve the construction of carriages so as to afford greater facility in the operation of turning, and it consists in an arrangement by which each wheel is permitted to turn, or make an angle with the side of the carriage, which is effected by separating the axle in the middle, or rather making a short axle for each wheel, which are attached to a vertical axis represented by *a*, fig. 1 and 2, plate XIV. One end of this vertical axis turns in a socket fixed in a cross-beam, which occupies the place of the axle-bed of carriages of the usual construction, and to the middle of this cross-beam is fixed a piece of strong framing, whose ends are curved outwards from the cross-beam to receive the other ends of the vertical axis, as represented by fig. 1.

A plan of this arrangement is represented by fig. 2, by which the method of preserving the two wheels, at the same angle, with respect to the sides of the carriage. *b* is a connecting bar, uniting the two wheels through the medium of the projecting pieces *d d*, and with this bar is connected the pole turning on the centre *c*. By this ingenious parallel motion the wheels are made to assume the position most advantageous, for turning with very little exertion on the part of the horses, as the friction is very considerably diminished by the reduction of the rubbing parts to mere pivots.

Miss Knowles details in her specification the methods of applying her improved axles to carriages, either with or without

springs, but the above principle is adopted in both cases, and it may be varied to suit the construction of the carriage for which it is intended. The advantages of this arrangement will be evident, when it is recollected that the central pivot on which the axles of the fore wheels of carriages usually turn, is situated so far from the wheel as to give a leverage requiring considerable room, for one wheel to advance, and the other to recede in the operation of turning. Whereas in the axles of the present construction the fulcrum is situated within four inches of the nave, and hence the wheel will lock its full extent without receding, or advancing, more than a few inches. We had written thus far when we received the following observations by the patentee.

"This invention wholly supersedes the necessity for a perch, and enables the body of the carriage to swing independently of the axletrees, and approach within a foot of the ground at its full width, besides the advantage of having high wheels, without danger of touching the body, however short the carriage is turned. It also reduces the weight of a carriage without lessening its strength. Another advantage is its having the axletree fast to the spring within 3½ inches of the nave, the unpleasant check to the wheel and the pole, which arises from obstacles in the road, is entirely removed. In addition to these may be mentioned the capability of the carriage going on three wheels, by a proper adjustment of the load, in case of an accident to the fourth."

Harness.—To William Leeson, of Birmingham, a patent for "certain improvements or additions to harness and saddlery, part or parts of which improvements or additions are applicable to other purposes," was granted on the 8th of July, 1829, and the specification was enrolled in the Enrolment Office on the 8th of January, 1830.

Mr. Leeson's improvements in and additions to harness and saddlery consist, first, in a stop which is made to slip forward in a dovetail groove on the point of harness hooks, and to be kept from receding by a slight spring falling into a notch, and thus preventing the parts from being accidentally unhooked; and, secondly, hinged eyes to be attached to the end of the saddle-straps for recovering the shafts, so that the horse may be attached to or detached from a chaise, &c., with greater expedition than with harness of the usual construction. These contrivances are really so simple and so trifling as to need no remarks on their merit.

WHITENING SUGARS.—To Joshua Bates, of Bishopsgate Street, London, merchant, a patent for "a new process or method for whitening sugars," the communication of a foreigner, was granted on the 1st of August last, and the specification was lodged in the Enrolment Office on the 18th of January, 1830.

The usual method of whitening sugar is by washing away the syrup and colouring matter with water; for this purpose, the sugar after boiling is placed in a conical vessel in an inverted position, with a small hole at its apex, and placing over it a mixture of water and pipe-clay, and by this means the water escapes from the clay in quantities sufficient to wash away the colouring matter, which is carried with it through the hole at the apex of the vessel. The use of the clay is to prevent the water from passing through in sufficient quantities to dissolve the crystals of sugar. Now, instead of using the clay which is apt to mix with the surface of the sugar, and in some measure to affect its taste, Mr. Bates proposes to use unglazed earthenware, or porous stone vessels, which permit the escape of the water into the mass of sugar in the form of dew in a finely divided state; and this process may be continued for any length of time until the sugar becomes perfectly white, which cannot be effected without frequently repeating the process when clay is used, as it is apt to get dry on the surface, and to prevent the farther escape of water.

The vessels used by Mr. Bates are represented by figs. 3, 4, 5, and 6, in Plate XIV. The porous vessels for the passage of the water may be made either cylindrical with handles as shown at fig. 4, or conical, tapering upwards as shown at fig. 3. The vessels for containing the sugar, when of the lump kind, are made simply conical; whereas those for the Moscovite sugar, which requires a larger surface exposed to the water, are made of cones, with apertures at their extremities as represented by figs. 5 and 6.

It is truly gratifying to us to be enabled to lay before our readers an invention of so much merit as the above, after having had to detail several insignificant schemes and contrivances neither calculated to be useful to the community, or profitable to the patentees.

ACCOUNT OF FRENCH PATENTS.

French Patent, for Five Years, from 9th April, 1822. Granted to Messrs. Gros *and* Gessionne, *of Paris, for methods of applying Lithographic Subjects on Bags, Pouches, Souvenirs,* &c.

These methods consist in taking any sort of skin whatever, such as those of calves and sheep, Morocco, or varnished, as sold in commerce without any other preparation. These skins are cut into pieces of a size suited to the object desired to be obtained. On every piece, any subject or drawing whatever is painted, lithographed, or engraved separately, and left in black, or coloured afterward at pleasure.

For painting the subjects, such as flowers and landscapes, and for colouring the lithographs and engravings, mineral and vegetable colours ground up with oil, essence of turpentine and other essential oils, and with water, are employed. A spirit of wine varnish is applied afterward, and dried by a moderate fire, or in sunshine. The object of this varnish, is, to preserve the painting, to prevent it from being rubbed off, and to render it very solid and impermeable.

French Patent, for Five Years, from 7th June, 1822. Granted to Gilles Rene, *Manufacturer, Paris, for the Composition of a Substance fit for Preserving Packing Cloths, Thread, Ribands, as well as Cords and Cordage of every kind, from damp or humidity.*

This composition is obtained by melting together over the fire, one pound of elastic gum, one pound of bituminous tar, two pounds of linseed oil, one pound of fat oil, and half a pound of litharge.

When the whole is melted, take it off the fire, for fear of accident, and add half a pound of essence (spirits of turpentine.)

Patent for improvement and additions. November 6th, 1823.

For the addition of new materials to the preceding composition.

Instead of making the composition as above stated, do it in the manner following:—

First, melt together over the fire, one pound of elastic gum, (Indian rubber,) one pound of bituminous tar, two pounds of linseed oil, one pound of fat oil, half a pound of litharge, one pound of salt of saturn, one pound of alum, and one pound of manganese.

Take it off the fire, as before, and add half a pound of essence (oil of turpentine.)

French Patent, for Five Years, from 21st September, 1822. Granted to Michel Schelheimer, *of Paris, for the invention of a process of Painting under Plate-Glass, (sous glace) and Common Glass, applicable to optical mirrors.*

The colours in use in this kind of painting, are, mineral silver-

white, mineral chrome yellow, Prussian blue, soot-black, vegetable rose-coloured carmine, mineral vermilion red, and mineral umber earth: all these colours are ground in fat varnish.

When the subject has been drawn, the painting is begun with the tints of light, which are made with white, yellow, carmine, blue, and gamboge yellow (*gomme gutte*,) which are transparent colours.

To represent a butterfly, for example, all the transparent colours are applied according to the proper gradations, and we finish with the darker colours, to bring out the light tints.

If it be a rose we intend painting, a very light tint is laid on first, and the shades are laid on afterward, with darker carmine.

For all subjects, such as flowers, fruits, birds, butterflies, arabesques, &c. we always begin with the transparent colours, and finish with the suitable dark shades.

To compose the green colours, Prussian blue and chrome yellow are mixed together in quantities, depending on the shade required.

When it is desirable to throw certain lights into the work, they are scratched out by means of an iron point, especially in the green leaves requiring high finishing.

After the painting is applied, we lay on a course of silver-white, ground with gum and water.

With respect to plate glass and mirrors, when painting is applied upon them, they are tinned or silvered afterward, as usually done for other objects of this kind.

French Patent, for Five Years, from 27th September, 1822. *Granted to* M. Michon, Sen. *of Melun, (department of the Seine and Marne,) for the invention of methods of making men and women's Hats of Plaited Straw, Twigs, and Whalebone, without seam.*

These hats are formed of a tissue, the chain of which is of whalebone, made thin by means of a sort of plane, composed of a piece of wood 3 inches long by 2 inches wide, in which a sharp plane-iron is lodged.

The shoot, weft, or filling, is of twigs or of straw. The twigs are split according to the form intended to be given to the texture, and are prepared in the same manner as the whalebone. As for the straw, it is split by means of an ivory or steel knife.

The hats are made by hand upon wooden forms, and when they are terminated, those which are intended for men are dyed black or gray, and those for women remain undyed. Women's hats are most commonly filled with straw, or with ends of ears, (*bouts d'epis.*)

The same process may be followed for preparing *shakos* for the use of soldiers.

Improvement and addition, 28*th December,* 1822. *Granted to* A. De Barnardiere, *Assignee of Michon's Patent.*

These improvements consist in introducing, in the preceding mode of manufacturing, the method of weaving twigs in flat breadths

(*eclisses*) of making hats with a shoot of willow plait, or poplar, or generally of every sort of green or dry wood; and, lastly, of the application of these different tissues to the preparation of shakos, and other head dresses, as well for the civil as the military.

As to the preparation of the different raw materials, that is precisely the same as in the patent granted to Monsieur Michon.

French Patent, for Five Years, from 31*st July,* 1823. *Granted to* M. Boullay, *Cutler to the Royal Veterinary School of Alfort, for a Method of Manufacturing Razors, with economy and despatch. Annulled by Ordinance of the King, September* 16, 1825.

Process.—The razor blades, prepared at one heat, are cut out by a fly-press and a matrix.

The backs of the razors are of iron or steel wire, cut of the length of the back of the blades, which requires no alteration. The groove in which the blade is fitted is made with a countersink, and one heating is afterwards given to the heel.

By these means a razor may be completed in an hour, will come much cheaper than those which are made by the usual methods, and may be of a cast steel of the best quality.

French Patent, for Ten Years, from 24*th January,* 1818. *Granted to* Messrs. Michaud, Labonte, and Depuis, *of Paris, for the invention of a method of Plating Copper* (cuivre) *with Platina.*

Take 123 grammes (= 1899.6 grains) of fine silver, which you are to prepare for solution by the addition of 490 grammes (=7567.6 E. grains) of nitric acid at 48°. (=1.50 specific gravity, at 55°. F.): introduce them into a mattrass, and expose it on a sand-bath over a continued fire, till the silver is perfectly dissolved.

Afterward prepare, in a porclain capsule, 490 grammes of white tartar, and the same quantity of marine salt. When these substances have been pulverized together, pour the solution into the capsule, and stir the whole with a wooden spatula, till a perfect mixture is obtained. This composition is used for preparing the copper intended to be plated: for this purpose, the copper is first cleaned, and this composition is afterwards applied to it to whiten it. This application being made, with the assistance of a flat and very clean piece of cork, upon the metal, the latter is afterwards enveloped by a leaf of virgin silver, and exposed to the action of a well-closed air-furnace. Let it heat to a degree above cherry red. Apply, by means of a burnisher, and rub on the plate without taking it out of the furnace, and this will apply the substance on the copper-plate. When the whole forms only one body, pass it between laminating rollers, to give it the consistency of a solid body. This first operation terminated, the leaf of platina is prepared of the proper size for the copper-plate intended to be covered, so as to envelop it, and both are cleaned with sand, to remove any grease they may have on them, and dried with clean linen, that there may be no moisture remaining. The

copper is then enveloped by the platina foil, in the same manner as it was before enveloped by the leaf of virgin silver, and submitted to the action of the same furnace as before, rubbing also in the same way with the burnisher, which applies the platina.

ACCOUNT OF AMERICAN PATENTS.

For an improvement in the Mode of Measuring and Cutting Boots. THOMAS HOWE, *Worcester, Massachusetts, April* 18.

THE boots are to be cut by using metal patterns, of which there are two, made in the shape of the common "crimping forms" used by boot-makers. These patterns are graduated, so that by the same guide the largest and the smallest boot can be cut. To effect this, holes are drilled near to, and at equal distances from, each other, extending inwards from the cutting edge of the pattern, of which holes there are several rows, which serve to mark the leather for placing the pattern to cut according to the size required.

A strap, properly divided, is used to obtain the measure of the foot.

"All I claim in my improvement, is, the holes drilled in the patterns, by means of which boots of the largest as well as the smallest sizes may be cut with one set of patterns."

"The advantages to be derived from my improvement consist in the saving of time, in cutting and fitting the boot to the foot more exactly, and with greater certainty, nothing being left to the judgment, as by the common method; in the fact, that any cobler may cut a boot that will fit, with the same exactness as that cut by the most skilful in the art."—*Franklin Journal.*

For an improvement in the Cylinder Paper Machine; ISAAC SAUNDERSON, *Milton, Norfolk county, Massachusetts, April* 18.

A GENERAL defect in the paper made upon cylinder machines, is, the inequality of its strength when tried lengthwise and across. This is in consequence of a greater number of fibres running in one direction than in the other, and a consequent want of that perfect interlocking which takes place upon mould-made paper. A part of the present machine is intended to remove this defect. For this purpose there is a "*horizontal whirl wheel*, which plays or revolves under the wing cylinder, so called, upon which the paper forms, and by distributing the current and counteracting the continuous motion of the pulp rising upon the cylinder, improves the quality, and increases the strength of the paper, by casting the fibrous parts of the pulp in every direction, and at the same time throwing the knots and motes on the outward surface of the sheet, (instead of depositing in the body of the paper) from which they can easily be removed without injury to the paper."

The other improvement is "the *sheet forming roller*; this roller is used, and put in the place of the *upper water pressing roller* (so called) of the cylinder paper machines. The sheet is formed on this roller, the circumference of which must be graduated according to the dimensions of the sheet required. The additional kinds of paper that can be made on the cylinder paper machine, by means of the improvement, or invention, of the *sheet forming roller*, and the *counteracting horizontal whirl wheel*, are, press paper; bonnet paper, pasteboard, and band-box paper."

There are eight floats on the horizontal whirl wheel, which are placed obliquely, the more perfectly to agitate the water. The whirl wheel and sheet forming roller constitute the claim.—*Ibid.*

For an improvement in the Paddle Wheels of Steam Boats, or wheels applicable to other objects, to prevent what is called "back water." Paul Boynton, *Ogdensburg, St. Lawrence county. New York, April* 21.

This is a wheel, upon the contrivance of which much thought has been spent, as its construction fully manifests. Its intention is to preserve a vertical position in the buckets of a paddle wheel. Many patents have been procured for this object, and we have before taken occasion to express an unfavourable opinion of the whole of them; not merely on account of their complexity, but because we believe that if the end could be attained without a multiplication of moving parts, it would offer but little, if any, advantage beyond the ordinary paddle wheel.

The present plan is certainly not less complex than some of its predecessors. To move ten buckets there are not many less than 200 moving parts, and this certainly would present some objection both in point of cost, and in liability to derangement.

In several of the plans alluded to, one general principle prevails. The buckets, or floats, have on each end two pivots, inserted into the rims of eccentric wheels, the rims being of equal size, and having their centres one as far below the other as the distance between the two pivots on one end of a bucket. An arrangement of this kind will keep all the buckets vertical throughout their whole revolution. Although the plan before us differs considerably from this, yet a little analysis brings it back to an analogous, if not the same principle.

How far this scheme will obviate back water, we cannot now discuss, but will make a single remark on the subject. Suppose the paddle wheel immersed to the centre of the shaft, the last dipping and rising buckets would then have no horizontal motion whatever, but would offer the same resistance as would a flat board of the same size, fixed to the side of the boat with its surface exposed to the water.—*Ibid.*

For a Cylinder Hemp and Flax Machine. James Y. Watson, John Blossom, *and* Andrew Burnet, *Salem, Washington County, New York, April* 21.

This machine is intended for breaking hemp and flax, either before or after being water rotted. Two hollow cylinders, three feet long, and four or five feet in diameter, are placed to revolve horizontally one above the other, and in opposite directions. Their peripheries are fluted or reeded, and touch each other within half an inch. Each cylinder is surrounded, for nearly two-thirds of its surface, with rollers of four inches diameter, very nearly touching each other, and approaching the large cylinder within one-fourth of an inch. The rollers are capable of receding by the agency of springs, by which they are borne up. These rollers extend from the top of the upper cylinder, as nearly as possible to its junction with the lower cylinder, which lower cylinder is surrounded by small rollers in like manner, but upon the opposite side.

A feeding apron, like that of a carding machine, supplies the upper roller, and a receiving table or apron below the lower roller conducts the material off after it has passed through the rollers.

The machinery must be properly geared, and may be turned by any sufficient power.

The arrangement of the fluted rollers and cylinders, and the steel springs by which the rollers are borne up, form the substance of the claim.—*Ibid.*

For a Machine for slitting Tenons, Veneers, &c., called the "Vertical Tenoner," and intended for Shop Purposes. John M'Clintic, *Chambersburg, Franklin County, Pennsylvania, April* 21.

This machine is furnished with a vertical, and also with a circular saw, either of which may be put in gear, and used. A carriage running upon rollers receives the piece which is to be tenoned: this carriage has a table framed across it, regulated by a *tail screw,* so as to set the piece to be sawed without the necessity of guaging. For all but very heavy work the carriage is drawn up by a weight and pulley; there is a rag wheel, however, which may be used when necessary. The claim is as follows: "running the driving shaft on points, also my plan of fly-wheel, also the manner of (fixing the) tail screw or table, preventing the necessity of gauging, and producing perfect uniformity of tenon, with but little care."

The cases are numerous in which patentees are at a fault to tell what to claim as new in their machines, especially where ingenuity has tortured an instrument into almost every variety of form, for the purpose of obtaining an exclusive right. There are several machines for tenoning, for which patents have issued, the essential parts of which appear to us similar to that in question; and there are in our country ten thousand workmen, who, if required, could make a machine equally suitable for this purpose, without having seen either;

and, after all this had been done, there would be very little of *invention*, properly so called, in the whole; but merely a condensation of larger machines, and an adaptation of parts of them to the particular purpose in view.—*Ibid.*

For a new and useful Machine for planing Floor Plank, and grooving and tongueing, and strengthening the Edges of the same, planing Boards, straightening and planing Square Timber, &c &c., called the Cylindrical Planing Machine. URI EMMONS, *New York, April* 25.

THIS machinery is confessedly similar to that for which a patent issued to William Woodworth, of Hudson, New York, in December last, Mr. Emmons claiming to be the true and original inventor: the correctness of this claim is in a fair way for investigation before the proper tribunal.*—*Ibid.*

For a Machine for washing Clothes. STEPHEN HINDS, *Montrose, Susquehanna County, Pennsylvania, April* 25.

WE wish it was universally known that all possible washing machines had been long since invented, abandoned, and re-invented, until all conceivable permutations upon every imaginable number of fluted rollers, dashers, rounds, rubbers, and squeezers, had been exhausted. We had rather visit the kitchen on a washing day than be compelled to describe " a new and useful machine for washing clothes, churning butter, and other purposes, not heretofore known or used." Unfortunately, however, the choice is with the patentee, and the duty of submission with us.

Conceive of two gridirons, hinged together at one end, and you have the form of the washing part of this machine; but, of course, it is made of wood. This frame-work is put into a wooden box, with a proper dose of soap-suds, and the clothes are placed between the two racks. A lever, like a pump handle, is attached by a rod to the lower rack, which is to be worked up and down until the clothes are completely cleansed. There is no claim, and of this we are glad. —*Ibid.*

For an Improvement in the Mode of manufacturing Salt from Sea Water, or Salt Springs. HENRY J. TUDOR, *Boston, Massachusetts, April* 29.

THE mode of procedure, for which this patent is taken, is designed to facilitate evaporation by solar heat, and seems to be well calculated to produce the intended effect. It appears to us to be

* Mr. Malcom Muir, of Glasgow, took out a patent for England, dated July 31, 1827, for machinery for the precise purposes abovementioned, and the means of effecting the same are in all probability very similar. Mr. Muir's specification and drawings are given in our third volume, second series, p. 66. —*Edinburgh Register of Arts.*

new, and is presented in its simple form, without appending to it other claims of doubtful novelty, which patentees so frequently hang as dead weights about the necks of their inventions.

Double-inclined planes are to be made, which will appear something like the roofs of rope-walks. They may be covered with hydraulic cement, &c., or may consist simply of boards, of from four to ten feet in length, running from the ridge to the eaves. The salt water is to run slowly down these into proper gutters. In order to distribute the water upon them, there is a gutter of wood which surmounts the ridge, and this is to be filled with the salt water. Gunny bags, or any suitable kind of cloth, or other material, is used to distribute the water from the gutters upon the inclined planes; one edge of a strip of cloth lying in the water, and the other, with a ravelled edge, hanging over on to the inclined planes. The water is thus carried over by capillary attraction, and the quantity may be graduated to the weather, according as evaporation goes on more or less slowly: this is effected by allowing the water in the troughs to stand at different distances from the top. In this way brine of the same strength may be obtained whenever evaporation goes on, the quantity only being varied according to the heat and dryness of the air.—*Ibid.*

For a Machine for sifting Grain, Flour, Rice, Flax-seed, and other Seeds, and separating all Sorts of Materials which are capable of Separation by sifting. John Nichols, *Boston, Massachusetts, April* 29.

Three or more wire sieves, the frames of which form quadrangular boxes, are placed side by side, over a common box or trough. A horizontal crank shaft, with three or more cranks on it, corresponding with the number of sieves, carry connecting rods or pitmen, which move the sieves alternately backwards and forwards. This constitutes the whole of the machinery, which will undoubtedly operate very well. Were we desirous of using such a machine, we should even now scarcely think it necessary to buy a right; and had we *invented* it before the present patent was obtained, we should not have claimed an exclusive privilege, lest the first wheat fan which we saw might contain a sifter with a crank, or some similar motion.—*Ibid.*

For an Improvement in the Construction of Hose, for the Purpose of supplying and distributing Water to Sails, or Sheets of Cloth, for the Protection of Buildings from Fire, called the "Fire-Screen." Caleb Pierce, *Salem, Essex County, Massachusetts, April* 29.

A common leather hose is to be perforated with holes a few inches apart; the extreme end of this hose is to be closed, and a sail or sheet is to be attached to it for the purpose of retaining the water

which passes through the holes. The hose may be drawn up to the eaves of a building, and the sheet allowed to hang at its side, or it may be drawn up to the ridge, and the sheet cover the roof, water is then to be supplied from a fire-engine to fill the hose.

We are apprehensive that it will rarely happen that such an apparatus can be fixed and supplied with water, so as to answer the purpose intended. It is easy to try a public experiment with such a contrivance, where all is concerted beforehand; but the anxiety, hurry, and confusion at a serious fire, will rarely allow of that orderly and systematic procedure which such an apparatus requires. Where it could be applied, it would certainly be very useful; we are apprehensive, however, that but few rights will be purchased, and, therefore, as a patented invention, it will probably disappoint the patentee.—*Ibid.*

For a Machine for grinding Grain, Paints, &c. HENRY AVERILL, *Richland, Otsego County, New York, April* 30.

THIS is a conical mill, but differs in several points from such as have been heretofore patented. The conical part, which is the runner, is placed horizontally, being perforated its whole length, to receive an iron axis. The apex of the cone is removed for three or four inches in length, and its place supplied by a grooved piece of cast-iron. The bed and cap stones lie flat upon each other, being properly confined in their places by iron pins. Each of these is excavated in such a form as to receive one-half of the conical runner. The grain is supplied from a hopper through a perforation extending from the apex of the cone through the cap stone. The inner gudgeon of the axis of the runner passes between the stationary stones at the apex of the cone. Its feed is regulated by a screw at the opposite end, and it may be driven by a whorl and drum, or by gearing in any other way.

It appears to be a simple and economical mill, and we should apprehend that it is very superior to several which have been introduced for domestic purposes.

For an Improvement in Power Looms, which can also be applied to other Looms. AMASA STONE, *Providence, Rhode Island, April* 30.

THIS improvement consists principally in the manner in which the reed is fixed in the lathe, within which it has a certain play, which is regulated by springs; and also in the means of forming a connexion with, and communicating motion from, the back part of the reed-frame, by the intervention of a strap, lever, and wheels, to the yarn beam. A general idea of the result will be obtained from the concluding part of the specification, which is as follows:—

"In operating a loom with this improvement attached to it, when the lathe is thrown forward, the reed is pressed against the weft or the cloth, and the lathe proceeds on three-eighths of an inch more of

less. This retarded motion of the reed draws upward the strap and wires attached to them and the lever, so that the catches on the upper end of the lever gain a tooth on the ratchet wheel. By this means the ratchet wheel, the large-bevelled cog wheel, the small-bevelled cog wheel, the shaft, the endless screw, and the yarn beam, are all caused to move.

"The advantages of this improvement are, that a greater quantity of work can be done with the same labour than without it—that the warp is equably delivered from the yarn beam at all times, without reference to its size—that the weft is equably distributed through the whole length of the warp, and cloth can be woven, close or open, at the option of the manufacturer, and, finally, that the yarn beam will cease to move and deliver the warp, whenever the weft is broken or out. The weight and thickness of the cloth depend wholly on the stiffness of the springs or flighters.

"I claim as my invention the connexion of the reed with the yarn beam, and the communication of motion from the one to the other, which *may* be done as is above specified."—*Ibid.*

For Machinery for cutting Veneers in one continuous Sheet, called "Burnap's Veneer Cutter." CALEB B. BURNAP, *Belfast, Waldo County, Maine, May* 1.

THE log to be sawed is fixed so that it may be made to revolve on centres like a piece of wood to be turned in the lathe, and in this situation is actually turned so as to become truly cylindrical. Circular saws, running upon the ends of mandrels, are placed in a row, with their faces in one plane, and their peripheries nearly touching, so as to cut the cylindrical log longitudinally and tangentially. A traversing motion is given either to the log, or to the frame upon which the saws are placed, sufficient to unite the cuts of the respective saws in one horizontal line.

The machinery to cause the log to revolve with any speed desired, and also to cause it to advance upon the saws, so as to preserve a regular thickness in the veneer, and to vary this thickness as may be desired, is, of course, provided, but need not now be described.

In sawing mahogany veneers, it is found that the mottle or curl is not generally developed by a continuous veneer all round the log. There is therefore described one modification of the machinery, which is intended to cut the veneers off in segments of a large curve.

The veneer as it is cut is turned up out of the way of the saws and of their mandrels, by rollers constructed for that purpose.

The claim is to the particular methods by which the foregoing objects are effected. This kind of saw-mill we believe to be new, and it is now in successful operation.

The only example with which we are acquainted of producing a similar effect, was the cutting of a large sheet of ivory, probably sixteen inches square. This was done by Mr. Joshua Shaw, of Philadelphia, five or six years since. The tusk was sawed round, in Mr. Burnap's manner, but by what kind of saw, and how arranged, we are not informed.—*Ibid.*

For a Mode of operating by Wind Power upon Machinery for grinding and bolting Grain, or for other Purposes. David M'Coller, *Hudson, Portage County, Ohio, May* 2.

A square building is erected, each side of which is formed of folding doors. In the centre of the roof, or upper part of this building, there is a sort of cupola, or hollow cylinder, in which the wind wheel is contained, which operates like a common oblique-leaved ventilator, or a smoke-jack, its wings or leaves being placed at such an angle as shall be operated upon with the greatest power. From the centre of this wind wheel the shaft descends, which is to give motion to the grinding machinery.

When the mill is to be set in motion, the doors opposite to the quarter from which the wind blows are to be opened, those to leeward being kept closed by weights and pullies to give a free passage to the wind when too strong.

The claim is to a wind-mill so constructed.—*Ibid.*

For a Cylindrical Rail-way Carriage. Peter Fleming, *Civil Engineer, New York, May* 4.

Were we writing for southrons only, who are acquainted with tobacco rolling, we should compare this carriage, in its structure and operation, to a hogshead of tobacco prepared for rolling, requesting at the same time to be freed from the suspicion of intending to disparage an invention, in which much ingenuity and skill are displayed, by using a homely comparison. The carriage is a cylindrical body, which may have an axis passing through it, or gudgeons affixed to, and projecting from, its ends, for the purpose of drawing it. The wheels are iron rims placed around the cylinder so as to encompass it like hoops; these stand at a proper distance from each other to run upon the rail; they are provided with flanches, or have their faces finished in any form suitable to the rail upon which they are to run. In the inside of the cylinder may be stowed boxes, barrels, bales, or other goods to be transported. When bars of iron, lumber, or other articles of considerable length have to be carried, the traction is performed in a different way; the carriage is then a hollow cylinder, not furnished with ends; the iron bars, boards, or plank, are passed entirely through it, and of course do not admit the employment of an axle or gudgeons. In this case an endless rope is passed round the middle of the cylinder, which is furnished with double rows of pegs to form a groove or checks to retain the rope or band in its proper place. This rope also passes over a pulley, which is attached to the horse, or other drawing power, so as to work like the large and small wheels of a lathe with their bands. Two, three, or more cylindrical carriages may be made to follow each other, when connected by bands in the same way.

Under this arrangement it is evident that whatever is carried must roll with the carriage, but in transporting some kinds of goods, and particularly in carrying *persons*, this would, to say the least of

it, be very *inconvenient*. To obviate this objection, a second cylindrical body is placed inside of the first, and is made sufficiently small to revolve within it. This is suspended upon the axis, or gudgeons, and is weighted on one side, so that whilst the outer cylinder rolls upon the road, the inner one will not revolve with it. It is proposed sometimes to make this suspension by the agency of friction wheels, so as to leave but little more friction than that which results from the rolling of the carriage. The patentee says :—

"What I claim is the use of a cylinder, or other volume of revolution, on a rail-way, as a carriage, or vehicle for transportation.

"I also claim as my invention the use of the endless rope in the manner above described, for progressive motion. By means of this use of the cylinder and traction rope, friction is saved, or avoided, to a greater degree than by any machine now known. The traction rope may be employed separately from the cylindrical rail-way carriage, in any other machine where similar progressive motion is required."—*Ibid.*

For an improvement in the mode of Manufacturing Paper by Machinery, by means of an additional machine, called the AGITATOR. REUBEN FAIRCHILD, *Trumbull, Fairfield county, Connecticut, May* 4.

THIS invention is intended to obviate a defect in the paper made upon the cylinder machines, it being very easily torn in one direction, although strong in the other ; this results from the fibres of the pulp being mostly arranged longitudinally with the length of the sheet, whilst in the hand-made paper they interlock equally in all directions. The *agitator* is a semi-cylindrical cradle of metal, which lies under the cylinder in the vat, the bars of metal of which it is formed running in the direction of the circumference of the cylinder, and at a small distance from it. By means of the crank motion, the agitator is made to vibrate in the direction of the length of the cylinder, whilst the latter takes up the pulp ; and in this way the fibres are to be made to interlock as effectually as in paper made in a mould. The claim is to the agitator.

A second application for a patent was made whilst the above was pending, by Messrs. Culver and Cole, of Massachusetts ; their machinery was identical in principle with that of Mr. Fairchild. An amicable arrangement was effected between the parties, by which a mutual ownership of the right was established, without the vexation, loss, and delay, consequent upon a suit at law.

A patent was granted to Isaac Saunderson, of Massachusetts, on the 18th of April, for another method of attaining the same end, as may be seen in the account of it in the present number.—*Ibid.*

For an improvement in the application of Felt for Carpeting. AARON BYINGTON, *Herkimer, Herkimer county, New York, May* 6.

THE specification is in the following words :—

"This improvement consists in making felt by a carding machine (with a filleting doffer) of width and length required for pieces of carpeting of various patterns, large or small, with the aid of a webbing cylinder, a creeper, and felted in the usual manner.

"After the felt is made, it is dried upon tenter bars, and sheared as cloth, and pressed. It is then printed, dried, and pressed, with a common clothier's press, when it is fit for floor carpeting, or coarse clothing, &c.

"What I claim as my invention, and for which I solicit a patent, is, the application of felt to floor carpeting, &c."—*Ibid.*

For a Revolving Four-barrelled Gun, and improved Percussion Lock. Henry Rogers, *Middletown, Butler county, Ohio, May* 7.

The four barrels are formed by boring four holes in a block of brass of about three inches in length, and 2¼ inches square, which block is made to revolve upon a centre, so that each of its perforations may alternately be brought to coincide with the bore of the main barrel. These perforations form the chambers to contain the charges. A percussion lock is adapted to this gun. The specification does not distinctly state the particular improvements claimed. The revolving barrel itself is not new, but in the way hitherto made has not answered the expectations of the inventor, as it soon gets out of order.

A patent for a revolving barrel to contain six charges was granted to Artemus Wheeler, of Roxbury, Massachusetts, in 1819, and we are informed that 100 rifles upon his plan were made at the United States arsenal, at Harper's ferry; and the same number upon another plan, varying somewhat from Wheeler's; very favourable anticipations were formed of their utility, but from corrosion of the metal where the barrels unite, or from other causes, a part of the charge soon escaped at this juncture, and they were all laid aside.

The present patentee states that eight shots can be made in a minute, and that one gun which he has tried, exceeds his most sanguine anticipations; it is not, however, during the honey moon that the question is to be decided whether all will "wear well." —*Ibid.*

For improvements in the art of Sawing Boards and other kinds of Lumber, and in the construction of saw mills, crank wheels, and gearing. Israel Johnson, *jun., Moriah, Essex county, New York, May* 7.

1st. The saw frame is to be made lighter than usual, say of 3 by 4 scantling; it is to be framed together by four cross pieces instead of two, the pair at top, and at bottom, to be each about two feet apart, with braces of wood or iron to stiffen them.

2nd. The pitman is also to be made light, with a brace from each side extending up to the bottom rail of the saw frame; this rail consequently working on three joints, or noddle pins.

3d. The crank wheel is to be balanced, that is, a weight is to be put upon the shaft upon the side opposite to the crank. A very great advantage is anticipated from so doing; as the patentee supposes that much power is lost by having to lift the weight of the crank on one side.

4th. Spring poles are to be made to operate upon the pitman. These are greatly to relieve the crank, not only in its labour of passing the dead points, but to co-operate with the power, both in raising and depressing the saw gate, or frame.

5th. A *veneer saw wedge* is to be fixed upon a thin saw plate. This wedge is a strip of iron the length of the saw, and is to be fixed upon that side of it next to the veneer. It is made wedge-shaped, its edge being placed towards the teeth, and its thick part towards the back of the saw. This is to give stiffness to a thin saw, and cause it to run as truly as a thick one. The wedge turns off the veneer, or other thin stuff which is being sawed.

6th. A horizontal circular saw running upon a vertical axis is proposed to be used. The description of this is not very clear; but it seems to be intended to cut veneers, &c. from the upper surface of a log placed upon a carriage, or from two logs at once, it being placed between them. A circular *veneer saw wedge* may he used to give it stiffness.

7th. Instead of cog wheels, friction wheels, or rather faced wheels, without teeth, turning each other by their friction, are proposed to be used for saw mills, and other heavy gearing.

The claim is to all these, and, we fear, therefore, that it is too broad. Cranks have been balanced a *thousand and one times*; faced wheels to work by their friction are acknowledged not to be new, but are claimed as applied to heavy machinery. *Query*, at what increase of size does an old contrivance become a new invention? The *veneer saw wedge* for a straight saw, appears to us to be the best of these arrangements, but if not found in good company, its influence will not be sufficiently redeeming even to save itself from legal condemnation, whatever may be the goodness of its physical properties.—*Ibid.*

SPECIFICATION OF PATENTS.

Specification of a Patent for an improvement in the Common Wool Carding Machine, in making an endless or perpetual roll, by means of a circular, or transverse doffer. Granted to Charles Atwood, *Middletown, Middlesex County, Connecticut, April 18th.*

This improvement consists in passing a sheet of cards transversely to the main cylinder, approximating so near a contact as to do the work of a doffer. This sheet of cards must be a continued sheet, passing the main cylinder either as a circle or a plane, with a transverse motion; and as a circular manner has been found best adapted for use, it will be particularly described. The circle upon which this

sheet of cards is placed, is fixed upon a shaft which passes under the main cylinder at right angles with its shaft, and is secured by boxes and caps to the girths of the frame of the carding machine, and from two to six inches from the centre, and is from four to six feet in diameter, and is covered with cards from the periphery towards the centre from four to eight inches, according to the length of the main cylinder, with the points of the teeth outward, and so placed, as to present a line of teeth entirely across the main cylinder, and revolving with a slow motion, it takes off the wool as it passes, and carries it round to the comb, which is affixed to a shaft by three arms, and is put in motion by a crank and pitman connected with a stud on the shaft, which it causes to vibrate on its points in two stands, which are bolted to the carding machine in such a manner that the comb will be in a tangent line with the inside circle of the sheet of cards; the vibrating motion of this comb (describing an arch of a circle,) takes off the bat of wool, and delivers it to the condensing machine, which condenses and conducts it to the can for subsequent operation.

These several parts mentioned above are put in motion by belts, or gearing, and from such parts of the carding machine as is most convenient.

The common cylindrical doffer, the common comb, the roller and the shell, are all rendered useless by this improvement. The transverse motion of the sheet of cards on a circle or a plane, across the main cylinder, with the manner of operating the comb, are what is claimed as new, and constitute the invention or improvement for which a patent is now prayed.

Specification of a Patent for a Machine for Breaking and Cleaning Hemp and Flax. Granted to Amos Salisbury *and* John C. Langdon, *Troy, New York, April 17th,* 1829.

This improvement is a machine consisting of three sets of rollers, from two to three feet in length, and ten inches, or thereabouts, in diameter.

The first set made with wooden slats, or staves, standing edgewise, mashing into each other, similar to the teeth of wheels, and, in principle, like the fluted rollers.

Each roller is composed of a shaft; two flanches, or heads into which the ends of the staves, or slats, are fastened; and the slats running parallel with the shaft. The edges, or points of the staves or slats, of the first set of rollers, are one and a half inch distant from each other.

The second set are made in the same way, with the edges, or points of the staves, or slats, at one and a quarter inch distant from each other; the teeth or slats are consequently more in number, and finer.

The third set are made in the same way, with the edges, or points, one inch apart; consequently the teeth, or slats, are still finer than the last.

These rollers are put into an inclined frame by sets; one roller of each set directly above the other of the same set, at right angles to the plane of the machine; the hemp, or flax, to pass through between the upper and lower of each set of rollers.

To the shaft of each of the rollers is attached a cog-wheel, which mashes into a corresponding one affixed to each of the adjacent rollers, so that by applying the moving power to either of the rollers, the whole of them are put in motion.

At the most elevated end of the machine is a platform so constructed that the hemp, or flax, laid upon it endwise to the rollers, will, by their revolution, be drawn between them; and, after passing through it, will be received upon a revolving cloth, or apron, at the other end of the machine.

The machine is so constructed as to occupy very little space.

The plan of this kind of roller we conceive is far better than the ordinary fluted roller, for breaking hemp or flax; the staves, or slats, being elastic, suffer the hemp, or flax, to pass through without mashing or tangling; and the spaces between the staves, or slats, and the openness of the roller, permit the shives to separate and fall through.

We propose to construct the staves, or slats, of wood, cast-iron, or wrought iron, according as the one or the other shall be found best to answer the purpose; their width, thickness, and form, may also be varied; the number of rollers, likewise, may be increased.

Specimen of a Patent for manufacturing of Shovels of Cast Steel and Iron, or of any other Steel and Iron, by Welding and Rolling the Steel and Iron together. Granted to Elizabeth H. Bulkeley, *relict of* Chauncey Bulkeley, *of the town of Colchester, Connecticut, February* 28, 1828.

Take a bar of iron of sufficient width, when rolled, for the length of a shovel or spade, scarp or slope down one side of the bar. Then take a bar of cast, or any other steel, about an inch square; draw it some, and scarp or slope down one edge; weld it on the face of the bar of iron on the side of the bar that is scarped or sloped down; heat it in a furnace, run it through a common rolling mill, until sufficiently thin for a shovel or spade. Cut up the plate crosswise, of a suitable width for a shovel or spade; shape the shovel or spade in cast-iron *dies;* make the shank of the shovel or spade of two pieces of rolled iron; rivet them on each side of the shovel or spade, with the handle in the middle. The shovel or spade to be ground and polished.

Specification of a Patent for the manufacture of Scythes by Welding and Rolling Iron and Steel together. Granted to Elizabeth H. Bulkeley, *relict of* Chauncey Bulkeley, *of Colchester, Connecticut, February* 28, 1828.

Take a bar of iron of a suitable size for the blade of the scythe.

Hammer it till one side is a little thinner than the other; then take a thin plate of cast steel, and weld it upon the thin edge of the bar, and then roll it down to a proper degree of thinness for the blade of a scythe. Cut the plate, if necessary, into suitable lengths for a scythe, and punch holes in the back edge of the plate; then turn up the back edge of the plate, at a right angle, as high as may be requisite for the thickness of the back; then take the back, which is to be forged of iron, and punch holes through it, corresponding with the holes in the plate. Rivet the back firmly on the plate, then turn the scythe in the usual way. The back must be made so wide at the heel as to admit of the blade being rivetted upon it with two rivets.

Specification of a Patent for a Moveable Cider-Mill and Press. Granted to Moses B. Bliss, *Pittstown, Kennebeck County, Maine, April* 21, 1829.

This improvement consists in combining in one moveable and entire machine the process of reducing apples to pummage, and of extracting the liquor, by means of a newly-constructed vertical wheel for grinding, its combination with other wheels, and the application of these wheels, rack, and pinions for pressing, known by the name of the "Moveable Cider-Mill and Press."

The wheel has an axis fastened in its centre on which it revolves; its periphery is smooth, and its surfaces straight from the centre: on both surfaces are fixed a convenient number of teeth, of steel or iron, projecting horizontally, a proper length to operate on the apples. Over this wheel is a hopper (to retain and conduct the apples), decreasing at right angles with the axis as it descends towards the wheel; on both sides of the wheel, directly over the axis, is a partition, so as to admit the apples to come in contact with either quarter of each side of the wheel. The hopper, together with the wheel, may be placed on the frame of the machine, over a box into which the pummage falls for pressing.

The wheel is to be put in motion by means of a small pulley fixed to its shaft, and a band extending to a horizontal band wheel. On a perpendicular shaft of this wheel is a pinion which mashes into a cog wheel, and a pinion on the shaft of the cog wheel engages with a rack upon the piston. The rack must be disengaged from the pinion by removing a key from behind the piston, when the machine is in operation for grinding, as the piston head forms one end of the box, and must remain stationary when grinding. The power is applied to the shaft of the cog wheel when a motion is required for grinding, and to the shaft of the band wheel when the pressing is performed: this is done by removing a sweep from one shaft to the other. After the pummage is sufficiently pressed, the bulkhead of the box is removed, and the piston extended to the front of the box, to free it of the pummage. The machine rests on two pair of wheels, one pair being smaller than the other, and adapted to turning, like the forward wheels of a waggon. It may be drawn by cattle by means of a tongue fixed to the axle of the smaller wheels. This mode of obtaining

power and motion, and the manner of moving the machine, has nothing peculiar in it.

A particular description of the frame for supporting the machinery, the dimensions of the wheels, &c., and their positions, is deemed unnecessary, because they may be varied according to circumstances.

Description of an improved Wheel with Revolving Paddles, applicable to the propelling of Ships and other Floating Bodies. Patented by Adolph Heilbronn, *New York, March* 16, 1829.

In the patent of Mr. Heilbronn several different improvements in navigation are described and claimed; in the present article we shall explain the first of them only, but shall hereafter present the others, having a plate prepared for that purpose.

These various inventions have been perfected, in conjunction with a gentleman in England, where a patent has also been obtained for them.

The revolving motion given to these paddles differs altogether from that which has been contrived with a view to their dipping into, and emerging from, the water vertically. The paddles or buckets, in Mr. Heilbronn's wheel, are each fixed upon an arm which radiates from the centre of the wheel, as may be distinctly seen by a reference to the engraving.

In a wheel so constructed, the paddles may be made to enter the water edgewise, and be turned so as to act upon it at any point which may be preferred. The paddles which are out of the water are all feathered, or turned edgewise, so as to experience but little resistance from the wind, and to require a very shallow box or casing to protect them on each side of the boat. A wheel of this description may be immersed in water to any depth which may be required, or it may be entirely under water where the depth is sufficient: should such a mode of fixing it be thought adviseable, the progress of the boat will be but little impeded thereby.

One great advantage anticipated from these paddles is the avoiding of those numerous and perpetual concussions produced by the striking of the water by the ordinary floats, which causes a continued, distressing, and very injurious tremulous motion. They enter by their edges, and are gradually brought into action.

The number of revolving paddles to be used will be best determined by experiment.

Figure 1, plate 2, represents one of the said wheels of eight arms or paddles as it appears when in a finished state, and as applied to the side of a vessel; and figure 2 is a view on a larger scale of the central part of the said wheel, as seen from the opposite side, or that nearest to the vessel, for the purpose of showing how the paddle-arms are held and supported in their places, and yet permitted to turn or feather at the proper instant while the whole wheel turns round; and figure 3 is a section of the same part of the paddle-wheel, as is shown by figure 2, and likewise of the piece G G, which is called the wiper carriage, which is immoveably fixed to the side of the ves-

sel, for the purpose of producing the turning or feathering of the paddles at the proper moment. In these several figures A A A A, is a circular disk or plate of cast-iron, having a rim or ring B B B, rising on one side to a sufficient height to give strength and solidity to the said circular plate, and also to take the brasses C C C through which the paddle-arms or axis D D D D are permitted to turn. The central block of metal E may be cast in one piece with the disk or plate, but will be better detached, and afterwards fixed to it by screw bolts, as shown in the section, figure 3, because, when detached, the brass sockets, or steps *a a a a*, for receiving the inner ends of the paddle-arms or axis can be more accurately bored and fixed. The disk or plate A A A A, with its centre block E, forms the central part of the paddle-wheel, which must be firmly keyed, or otherwise fixed upon the main shaft F F, which derives its rotary motion from any power applied within the vessel, and this shaft also passes freely through the centre of the metal wiper carriage G, which is firmly and immoveably fixed to the side of the vessel, for the purpose of operating upon the wipers or projections *b b* of the paddle-axis, in order to produce the turning or feathering of the paddles. To effect this, the outer face of the wiper carriage presents two annular surfaces, as seen at *c* and *d* in figure 4, (which is a front view of it,) and a part of one of them is cut away as at *e e*, to a greater or less extent, according to the period at which it may be desirable to make the paddles turn or feather. The wipers or projections on the axes of these paddles are projections of steel or other metal, crossing each other so as to project at right angles from the axes of the paddles, and as these wipers come into contact with one or other of the annular surfaces *c* and *d*, figure 4, and also seen in figure 2, the several paddle axes will each make a quarter turn or revolution. Thus the five wipers *z z z z z*, figure 2, lie with their flat surfaces upon the annular surface *c* of the wiper carriages, but that surface is cut away between *e* and *e*, (as is more distinctly seen in figure 4,) and the inner annular surface *d* then presents itself, and acts upon the wipers *z z* to turn them round; consequently the inner wipers *y y y* will now assume the flat position, and will continue in it, until they are again brought by the motion of the wheel, into contact with the ends of the outer annular surface *c*. It will thus be seen, that by enlarging or contracting the opening *e e*, figure 4, and with it the inner annular surface *d*, that one, two, or more, of the paddles may be made to stand at right angles to all the rest, and thus that any number of paddles may be made to move through the air, and to enter into and come out of the water with their thin edges forward, while the remainder, or those that are under the water, will remain steadily in that position in which they are most effective for the purpose of propelling, as is distinctly shewn by the manner in which the paddles are arranged round the wheel, as shewn by figure 1. It will be necessary to employ springs to prevent the blow and concussion, which would otherwise take place between the wipers on the axes of the paddles, and the ends of the wiper carriage upon which they strike, and by which they are turned round; and the best application of such

springs, is to use those of the spiral kind, of considerable strength, and to introduce them into round holes very nearly fitting them, and drilled in the ends of the wiper carriage which first comes into contact with the wipers. The spring being introduced into the hole, a cylinder of hard steel just fitting the hole is placed upon it, and there fixed by a pin driven through a chased mortise hole in the said cylinder, in such a manner that the said cylinder can fall wholly into the said hole when pressed upon, but without such pressure, will project about half an inch or rather more out of the said hole; and as the said wheels are so fixed as to require cases to protect them, as in ordinary steam-boats, such cases may be formed of light iron work, covered over with slight iron bars, or with strong wire work, because such open work cases do not offer the same resistance to the wind and water as close boarded cases do; and moreover, they have the effect of much more effectually breaking the force of the waves when they drive against them. Bars or rods with points upon them are also fixed to the insides of such cases, causing the said points to come as nearly as possible to the paddles and paddle axes without touching them, for the purpose of clearing off any weeds that may attach to the paddles, and likewise to protect them from striking against any timber, ice, or other floating substances, by which the paddles of steam-boats are frequently broken or injured.

The claims of the inventor, in the paddle wheel and its appurtenances, are, First, to the frame work, or wheel, as above described, for holding the patent paddles. Secondly, the introduction of springs to act upon the wipers. Thirdly, the paddle box made of open wire-work, net, or cross bars, with projecting pieces, or points, to clear the paddles.

Experiments are now in progress in New York, for testing the value of the foregoing machinery. The trials hitherto made have been attended with satisfactory results; but experience teaches us to suspend a final judgment until the thing is fairly tested, in a vessel of the ordinary size.—*Franklin Journal.**

Description of a Revolving Boiler for Steam Engines, invented by Francis Coffin, *and* Charles C. K. Beach, *of Boston, Massachusetts. Patented June 29th,* 1829.

A cylinder of iron or copper, is made of such length and diameter as may be determined upon: a second cylinder of the same length, but two, or more, inches less in diameter, is placed within the first, and a hoop of metal inserted at each end, to fill the space

* A model of a paddle wheel of the description above specified, was exhibited recently in the National Repository, which, we presume, was sent there by the English patentee alluded to, at the commencement of the paper. It did not appear to us, upon inspection, calculated to answer, on account of the multiplicity of its parts, its consequent weakness, and liability to derangement. The waste of power in the common paddle, which *may*, however, be a greater evil than the frequency of repairs in a more complex machine wherein the power is saved, or duly applied. The mode of feathering is, we believe, original, and deserving of a fair trial, but, we must confess, our expectations of its success are very slender indeed.—*Ed. Register.*

between the two. This hoop is rivetted, and made steam-tight, and a space of one inch, or upwards, is, of course, left between the two cylinders. This space is to be kept full of water, for the supply of the revolving boiler, that is to be contained within the outer case, which the patentees denominate the heater.

The heater may vary in its form; it is intended sometimes to make it egg-shaped, and to increase the space at the upper part, so that in a transverse section it would be somewhat in the form of a new moon. A boiler of this kind may be constructed without being enclosed in brick work, and is particularly adapted to steamboats.

Through the top of the heater, two, or more, perforations are made, for the passage of smoke and flame from the fuel. Cast-iron heads are made to close the circular ends of the heater, and in these there are man holes, and such other openings as may be necessary. A cylindrical boiler is placed within, and extends the whole length of the heater; this boiler is supported upon hollow gudgeons, which proceed from the centre of each of its heads, and pass through suitable openings in the iron plates which close the ends of the heater. Upon these gudgeons the boiler is made to revolve. For this purpose they rest, when the boiler is full, upon the openings in the heads of the heater; but as one of the ends is, to a certain extent, susceptible of being elevated and depressed, the opening in the head through which the gudgeon passes, is lengthened upwards, the gudgeon, or rather the pipe, which passes into it, resting upon an apparatus, to be presently described.

Under the boiler is a furnace, and ash pit, built up with brick work, in the manner of other cylindrical boilers.

By means of a force pump, the heater is kept constantly filled with water, and from this it passes into the boiler through one of the hollow gudgeons. Through the other gudgeon the steam escapes to supply the engine. One of these gudgeons is, we have said, capable of being elevated and depressed. This is effected by a lever with a long and short arm, which extends horizontally over the boiler. The short arm is connected to the gudgeon of the boiler, which is capable of elevation; and upon the long arm is hung a weight, which is an exact counterpoise to the weight of the boiler, and the contained water, when sufficiently filled. When the quantity of water diminishes, the weight on the lever preponderates, and this, by a proper connexion with the force pump, increases the stroke of the latter, and consequently the supply of water.

Instead of the heater before described, it is proposed sometimes to surround the boiler with metal tubes, running longitudinally with it; having connecting pipes at their ends, to convert them into a continued tube, into one end of which the water is forced, whilst from the other it passes into the boiler, through its gudgeon, as from the heater. These tubes are kept in their places by resting on hollows in the cast-iron furnace heads, and are surrounded by the arched brick work of the furnace.

The boiler is made to revolve by the motion of the steam engine,

a toothed wheel which carries it being secured by screws on to one of the gudgeons. By means of proper gearing, the rapidity of the revolution is placed under the command of the engineer.

"The heater is always full, but it is obvious that the boiler, continually revolving, requires but little water, say from one-twentieth to one-tenth of its capacity, thus leaving almost the whole of it for steam-room.

"The boiler containing so little water, is heated in a few minutes, whereas, in the common boiler, the body of water is so great, that it requires a very long time to get up the steam, and at a great expence of fuel.

"The danger of bursting in the common boiler, from being unequally heated, and from the great body of boiling water within, is justly considered imminent. The revolving boiler is always equally heated, and the volume of water, being comparatively nothing, the danger is proportionably decreased.

"What we claim as new, in the foregoing specification, as being of our inventions, are:

"1st. The revolving boiler, as entirely new and hitherto unknown; and we claim the exclusive use of it, with or without the heater, and with or without the pipes; it being, in either case, much superior to any known method of generating steam.

"2nd. The heater, which surrounds the boiler, and supplies it with boiling water.

"3d. The pipes answering the same purpose as the heater.

"4th. The manner of suspending the boiler at one end, by which contrivance it feeds itself."

There appears to be a great analogy between the foregoing and the patent boilers of Messrs. Thompson and Rurr, described in the — vol. of this work, — series; but we cannot say that the similarity holds good throughout, as the details of the construction of Messrs, Coffin and Roach's boiler are not very clearly described in the foregoing paper, or, they are too complex to be rendered intelligible without drawings. We have made this remark from reading the patentee's claim: "1st. In which the fact asserted, and the consequence deduced, have neither truth or experience for their basis." —*Ed. Register.*

For an improvement in the mode of making Cloth by Machinery. HENRY RAYMOND, *New York, June 27.*

THERE is in Mr. Raymond's specification, a very exact description of the machinery which he employs in manufacturing cloth by felting, without spinning or weaving. We have recently had occasion to notice some patents which have been issued for the same purpose, and have adverted to former attempts of the same kind. Besides the present claimant, it will be seen that patents bearing the same date, have been obtained by Mr. Van Hosen, of Connecticut, and Messrs. Peck and Taylor, of New York.

The revival of this plan for manufacturing cloth, has, we have no doubt, been suggested by the machines now so extensively used in the manufacture of hats, in which the wool is taken from the carding machine on to a conical former, for the purpose of felting.

The essential parts of Mr. Raymond's machine, are, a wool carding machine, and a roller fixed upon a carriage, which traverses in front of the doffing cylinder. In the machine described, the cylinder upon which the bat of wool is to be received, as it is delivered in a sheet from the carding machine, is five feet in length, and three feet in diameter. As the carriage which supports it traverses in front of the doffing cylinder, and in the direction of its axis, the wool alternately crosses the preceding layer. A second, and smaller cylinder, or roller, rests on the periphery of the large one, and, by its pressure, slightly consolidates the layers of wool, and prepares it for felting. A cylinder of this size will afford a piece of cloth of about five by nine feet, but this may be varied according to the size of the machinery. The particular mode in which the large cylinder is made to revolve, and its carriage to traverse, it is not thought necessary to describe.

The claim is to " the above method of forming cloth webbing, of wool, or of any other material which has felting properties, by the use of the carriage and two cylinders, made to perform the above mentioned motions."

It is stated, that " upon this plan of operation cloth may be made of any desirable length and width, and suitable for carpets, blankets, rugs, gentlemen's wear, and other purposes, in greater perfection, with more despatch, and less expense, than by any other method, and the machinery is easily kept in repair."

For an improvement in the Printing Press, for which a Patent was obtained on the 8th of February, 1819. JOHN J. WELLS, *Hartford, Connecticut, June* 29.

THE press is one of those in which the power is obtained by causing a lever, acting horizontally, to operate upon two others, which form what is usually known under the name of the *toggle-joint.* The improvement made is in the mode of connecting these moving parts.

For a new and useful machine for Fastening and Securing Window Shutters. TRUMAN BARTHOLOMEW, *New York, June* 30.

THIS *machine* consists of two latches, and two catches, one pair of them to fasten the shutter, when open, against the wall, the other to secure it to the sill when closed. A particular description we should deem superfluous, as the contrivance possesses no great novelty. It will, undoubtedly, answer the purpose equally well with fifty others, patented and unpatented, which have been offered to the public, and probably better than several of them.

HOUSE-BREAKER'S INSTRUMENT.

TO THE EDITOR.

SIR,—On passing through the gallery of the "National Repository" some time ago, I observed amongst the assemblage of novelties there exhibited, an instrument which is said to be employed by thieves for opening, from without, such street doors as may happen to have the keys left in their locks, inside of the house, and as I know it is a common opinion that the leaving of the key in the lock adds to the security, on the supposition that it prevents the insertion of a "picklock, or skeleton-key, it is proper that the public should be put on their guard respecting the danger incurred by this supposed measure of security.

The instrument in question is merely a peculiarly formed pair of plyers, which I have delineated, with the mode of its application, in the annexed sketch. (See plate XIV. fig. 7.) *a* is the key of the door, supposed to be inside of the house, *b* the plyers, the two chops of which (technically called the nose) form, when together, a hollow cylinder; the inside of these are provided with file-cut teeth, so as to take a firm gripe of the extremity of the key when placed between them. The dotted lines, *d* are intended to shew the situation of the key-hole of the door through which the nose of the plyers is put, and when hold has been taken of the key, the chops are compressed together with great force, by turning the nut *f* upon the screw *e*. By these means the key has a firm handle on the outside of the door, and may be unlocked there as easily as in the inside. I am, Sir, your constant reader, &c.

ONE OF THE NEW POLICE.

LIST OF NEW PATENTS SEALED.

PROPELLING VESSELS.—To W. Hale, of Colchester, Essex, for a machine or method of raising or forcing water for propelling vessels.—12th Jan. 1830. Specification to be enrolled in Six months.

LOCKS.—To J. Carpenter, Willenhall, Stafford, and J. Young, Wolverhampton, for certain improvements on locks and other securities, applicable to doors and other purposes.—18th Jan. 1830. Six months.

RECIPROCATING ACTION.—To W. Parr, of City-road, for a new method of producing or reciprocating action, by means of rotatory motion, to be applied to the working of all kinds of pumps, mangles, and all other machinery in or to which reciprocating action is required, or may be applied. 18th Jan. 1830. Four months.

MACHINERY.—To E. Dakeyne, and J. Dakeyne, Derby, for a machine or hydraulic engine for applying the power or pressure of water, steam, and other elastic fluids, to the purpose of working machinery, &c.—21st Jan. 1830. Six months.

DESCRIPTIVE ACCOUNT OF ALL THE PATENTS ENROLLED BETWEEN 20TH JANUARY AND 20TH FEBRUARY, 1830.

Particularizing the Offices in which the Specifications may be inspected, with the Dates of Enrolment.

DRESSING CLOTH.—To Joseph Chisild Daniell, of Limpley Stoke, Bradford, Wilts, clothier, a patent for "certain improvements in machinery applicable to dressing woollen cloth," was granted on the 8th of July, 1829, and the specification was deposited in the Enrolment Office on the 8th of January, 1830.

It will be recollected that Mr. Daniell specified, in March last, a patent for improvements in machinery applicable to dressing cloth, and another for improvements on the first patent on the twenty-fourth of last November, described in the January number of the *Register of Arts*, p. 163; and the present is a patent for an improvement on the last, consisting in the introduction of adjusting screws under the spring of the card-board, and also a slight modification in the rollers which conduct the cloth to and from the gig-mill.

That it may answer this gentleman's purpose to expend several hundred pounds on patents for these trifling improvements on improvements we are not prepared to deny, but we confess our inability to see their utility. Before he had specified his patent in March, he must have had another in progress for inventions which might have been included in the first, for the title was sufficiently general to include them; and long before he specified the second, he had in progress the third for improvements, which evidently belonged to the second. Mr. Daniell seems perfectly ignorant of the six months which usually intervene between the sealing and enrolling of the patent being given for the very purpose of completing experimentally the invention for which the patent is granted.

GENERATING STEAM AND CURRENTS OF AIR.—To Moses Poole, of Lincoln's Inn, London, a patent for "certain improvements in the apparatus for raising or generating steam and currents of air, and for the application thereof to locomotive engines and other purposes," was granted on the 8th of July last, and the specification was lodged in the Enrolment Office on the 8th of January, 1830.

This invention is said to have been communicated to the

patentee by a foreigner residing abroad, and this circumstance must account for the specification containing principally arrangements already patented, published, and abandoned by the patentees. The steam-boiler described, consists in a series of straight tubes placed horizontally, some under, others over, and some on each side of the fire. The first tube is joined to the second at one end, and the second is joined to the third at the other, so that the whole boiler consists, in effect, of one continuous tube. Through this the water is driven by a forcing pump, and when sufficiently heated it is admitted into a vessel called a separator, and thence conveyed to the working cylinders. From the cylinders the steam is conveyed still in a highly elastic state to a reservoir, from which it escapes by four very small apertures up the chimney, carrying with it the air in the chimney, and by that means creates a current, which may be increased or diminished at pleasure by an alteration of the apertures through which the steam escapes, which apertures must never be so large as to allow the steam to escape from the reservoir so fast as to diminish its elasticity, a circumstance which would cause an irregularity in the passage of the steam, and consequently of the draft of air through the chimney.

When this apparatus is applied to a locomotive carriage, it is necessary to supply water to the boiler before the carriage starts, as well as during occasional stoppages, which the patentee proposes to effect by hand, or by lifting the wheels off the ground, and then working the pump by the engine, as the wheels may then turn without propelling the carriage. The carriage is lifted by a lever extending from the axletree, or a fixed point near it, and reaching a few inches farther than the circumference of the wheel; and when this lever is brought directly under the wheel, by winding a chain from it on a drum, or drawing it by a piston in a small steam cylinder, the wheel is at liberty to turn freely. This is really the most cumbersome and clumsy method of putting machinery out of gear which can well be devised; but the patentee proposes to use the same contrivance as a drag to impede the progress of the carriage when descending hills.

MEASURING TAPES.—To James Chesterman, of Sheffield, Yorkshire, mechanic, a patent for "certain improvements in machines or apparatus for measuring land and other purposes," was granted the 14th of July, 1829, and the specification was lodged in the Enrolment Office on the 14th of January, 1830.

A very few words will suffice to describe this invention, as it consists in the application of a coiled spring, similar to those used for watches to the axis of a measuring tape-box; and if the tape be long, a train of wheels is introduced to produce a greater number of revolutions in the axis by the uncoiling of the spring. We need scarcely mention, that the use of the spring is to wind up or draw in the tape after it has been applied to the space to be measured.

COACHES.—To Thomas Brown, of Birmingham, a patent for "an improved coach," was granted on the 5th of August, and the specification was deposited in the Enrolment Office on the 5th of February last.

The object of this patentee is to construct a coach of the stage kind, which shall be lighter without being weaker, and at the same time easier drawn, less liable to be upset by irregularities on the road, and freer from jolting motion than stage-coaches of the usual description.

These desirable qualifications he proposes to obtain by the introduction into one coach of a variety of improvements, which have been individually designed and separately applied to different coaches. The lower framing of the coach body is made sufficiently strong to admit of the axles being attached to it without the intervention of a perch or lower framing, and thus lightness is obtained. The springs, four in number, are fixed to the axles, and made to pass horizontally along the side of the coach; and this circumstance, together with that of depositing the greater part of the load very low, is stated by the patentee to obviate much of the jolting motion experienced by passengers.

The load is brought lower by having the axle of the hind wheels bent into a crank form to admit the body of the coach to reach near the ground, by this room is obtained for luggage, as well as for the feet of the inside passengers.

It would be difficult to point out in these arrangements any thing new. Mr. Brown does not, however, lay claim to any of them separately as his invention, but only as his method of uniting the whole to form a stage-coach which shall possess the advantages above enumerated.

EXTRACT OF COCOA.—To John Marshall, of Southampton Street, Strand, London, tea-dealer, a patent for "a method of preparing or making an extract from cocoa, which he denominated

Marshall's Extract of Cocoa," was granted on the 10th of December, and the specification was deposited in the Enrolment Office on the 10th of February, 1830.

Mr. Marshall's invention consists in boiling for an hour a pound of powdered cocoa in a gallon of water. The mixture is then to be passed through a sieve, and the oily matter skimmed from the surface. It is next to be evaporated in a water bath till it assumes the consistence of treacle, when it is to be preserved for use in bottles well corked and sealed, so as to render them impervious to the air.

TILES.—To Francis H. N. Drake, Esq., of Colyton House, Devon, a patent for "improvements in tiles for houses and other buildings," was granted on the 25th of July, and the specification was deposited in the Enrolment Office on the 25th of February.

This improvement may be briefly described to consist in making the upper ends of the tiles, whether of the flat or pantile kind, so thin that the lower tapering ends of the next row of tiles fit upon them, by which a smooth surface is obtained, which will prevent the tiles being raised and blown off by high winds. On each side of the tiles grooves are made for the passage of water, and the shoulder, to which the upper tier of tiles lap over, is made to bevel or slope from the middle downwards to convey the water into the side grooves.

The patentee describes the method of making his improved tiles, which, as it does not essentially differ from that generally used, we have deemed unnecessary to detail.

SHARPENING KNIVES.—To Francis Westby, of Leicester, cutler, a patent for "certain improved apparatus to be used for the purpose of whetting or sharpening the edges of the blades of razors, penknives, or other cutting instruments," was granted on the 26th of November, and the specification was deposited in the Enrolment Office on the 26th of January last.

The improvements proposed by Mr. Westby consist in the application to a hone or oil-stone of a guide to keep the edge of the razor or other cutting instrument at the same angle with respect to the surface of the hone during the operation of whetting. This is effected in two ways: first, by placing over the hone a plate of metal extending its whole length, and adjustable, at any required distance parallel to its surface, by set screws. Now, in the operation of sharpening, the back of the instrument is kept

resting upon the guide-plate while the edge is applied to the hone.

The second method consists in the application of two hones placed in an erect position, with a space between them for the razor, which is to be fixed by screws into a small horizontal frame, made to slide upon a circular rod, so that the edge can be applied alternately to the hones. These can be elevated and depressed at pleasure, so that their surfaces may be uniformly worn while in use.

The patentee also mentions a method of attaching to his hone a leather strap which is made double, and kept stretched by adjusting screws attached to the frame of the hone, or else to the end of a rod, extending lengthways between the two folds of leather.

LACE.—To Thomas Bailey, of Leicester, a patent for "improvements in machinery for making lace," was granted on the 5th of August, and the specification was deposited in the Enrolment Office on the 5th of February last.

The lace machine, to which Mr. Bailey's improvements are intended to apply, is that distinguished by the name of Lever's Lace Machine, all the motions of which, by the additions and alterations which he has introduced, he obtains from one continuous rotatory motion, an object evidently of much importance. The motions of a lace machine are necessarily somewhat complicated, for they are numerous, and require to be in action at different times, but such as have a precise relation to each other. From this, it will be perceived, that some of the moving parts of the machine must be at rest while others are in motion; and the principle by which this is effected by Mr. Bailey, while the action of the first mover is uniform and continuous, is by the introduction of crank rods, which lengthen and shorten in different parts of their revolution. This lengthening and shortening is produced by the action of cams, and wheels with notches for the lever bearers to rest in at particular positions of the moving parts.

RAISING FLUIDS.—To Edward Weeks, of King's Road, Chelsea, a patent for "improvements in raising fluids to various distances," was granted on the 14th of August, and the specification was deposited in the Enrolment Office on the 13th of February last.

The object of this patentee is to communicate heat for horti-

cultural or other purposes by the circulation of heated water or other fluid, though it is not so expressed in the title of his patent. In communication with the boiler for heating the water, he has a cistern situated somewhat above it, and from this cistern the hot water proceeds in a horizontal pipe, and when it has given out the required portion of heat it returns into the lower part of the boiler to be again heated. The only novelty in this part of the plan is the division of the boiler into two parts, one of which is designated a cistern. A method of raising heated water from one level to another without the aid of syphonic action, or increasing the pressure within the boiler, is described to consist of a small vessel introduced into the boiler or other hot-water vessel connected therewith, and from the upper part of this small vessel proceeds a pipe for the ascent of hot water, which is returned into its lower part by a second pipe, and thus the small vessel may be regarded as a second boiler which sustains the pressure of the hydraulic column, so that the principal boiler may be either left open at top, or slightly covered. Mr. Weeks proposes occasionally to include the descending pipe within the ascending one, and in all cases to make them flat, so as to expose the greatest possible surface to give out heat. The novelties in this part of the arrangement are—first, the introduction of a separate vessel for heating the water to be elevated, calculated to be useful on many occasions where the supply of heated water to an elevated situation is not required to be constant; and, secondly, in the introduction of one pipe within the other, a plan more likely to diminish than increase the quantity of heat given out, as part of the radiating surface is concealed by the exterior, or ascending pipe. When Mr. Weeks requires a circulation of fluid in less time than is necessary for heating the whole quantity of water in the apparatus, he stops the communication between the large pipes and the boiler, and employs a set of smaller pipes.

Distillation.—To William Shand, of the Burn, in Kincardineshire, a patent for "improvements in distillation," was granted on the 10th of August, and the specification was deposited in the Enrolment Office, on the 10th of February last.

With a view to rectify the spirit during the process of distillation, Mr. Shand introduces between the still and the worm tub a series of vessels made of wood, or other substance, which conducts heat slowly, but with a metallic top to conduct the heat quickly. From the top of the still proceeds a pipe of copper, or

other metal, which enters at the upper part of the first vessel, and descends to the bottom, where its diameter is somewhat enlarged, and enters into a small cup, which is to be filled with water, when it is used in distilling materials which require to be received through water. Similar pipes proceed from the top of the first vessel, in like manner to the bottom of the second, and from the top of the second to the bottom of the third, which gives off the spirit to be condensed, and received for use in the usual manner.

This invention is evidently the production of a man practically acquainted with the processes of distillation and rectification; and in such hands it can hardly fail of being rendered useful.

COMMUNICATING HEAT.—The same gentleman specified on the 20th of February, a patent for improvements in communicating heat, for the purposes of distillation, evaporation, &c. through the medium of turpentine, or oily substances.

Into a boiler *b*, figs. 5 and 6, plate XV. containing the oily substance, is inserted the bottom of the still *a*, and from this boiler proceeds a kind of flue, or passage *c* for the vapour of the oil to ascend spirally round the still, or pan, and thus continue to give out heat to the sides of the still, by which the oil vapour becomes partially condensed, and round the upper part of the still is a channel for water *d* to complete the condensation of the oil vapour, but in addition to this, a small pipe proceeds from the upper coil of the spiral passage, through a small worm tube, to prevent the possibility of any accident, or nuisance, arising from the escape of uncondensed oil vaponr. The boiler, spiral passage, &c. are to be surrounded by fine brick, or other non-conducting substance. The flame from the fire *g* impenges against the bottom of the boiler, near the front, then proceeds along the middle, nearly to the back, where it meets the resistance of a semi-circular partition *h*, which partly returns it, and sends it towards the edges on each side, where its direction is again reversed, and it finally escapes at the back.

ANCHORS.—To William Rogers, of Norfolk-street, Strand, London, a patent for "improvements in the construction of anchors," was granted on the 21st of August, and the specification was deposited in the Enrolment Office on the 19th of February.

This patentee, who is practically acquainted with the use of anchors, describes various alterations in their construction, by

which they are rendered stronger, without being either larger or heavier than those manufactured in the common way. He makes the shank of four pieces of iron, welded together, forming a hollow square in the interior, which is filled up the greater part of the length by a piece of oak, and firmly secured by a series of oval-shaped rings, or hoops. On two sides of the shank in the direction of the flukes, the pieces of iron are made strong, and shaped semi-circularly on the exterior. The lower part of these pieces are notched in the interior, bent back, and welded to the fluke arms. The angular openings made by the bending on the heel of the bent pieces, are made up and strengthened by welding on a piece of iron on each. The side pieces of the shank are made much thinner, and introduced between the others, and, therefore, not required to be rounded off at their edges. The fluke arms are also made up of pieces of iron, arranged and welded together, so as to afford the greatest strength obtainable from the quantity of materials employed.

The upper end of the shank is square, and made to fit into the stock, through a hole, which is bushed and well secured by a plate of iron on each side. Into this hole the end of the shank is securely fixed by a wedge, or key, passing through it across the stock. By this plan of attachment, the stock may be removed, and fixed at any time with the greatest facility, without the aid of a carpenter. The cable ring is connected by a bridle-shaped piece bolted to the projecting end of the shank, so that it can be readily removed when the anchor is to be unstocked.

CANNON.—To J. Tucker, of Hammersmith, a patent for "certain improvements in the construction of cannon," was granted on the 9th of September, and the specification was lodged in the Rolls Chapel Office, on the 26th of January.

This improvement consists in boring the cannon right through, as shewn at *b*, fig. 3, plate XV. and introducing a stop-cock *a* for the breech. The intention of this is to afford an opportunity of loading the cannon from the breech, to save bringing back the guns, and other inconveniences attending the usual method of loading and cleaning. *c* is the charge. *d* is a lever, by which the stop-cock is turned. *e* is a cover plate, with two apertures, *f f* one of which is always over the touch hole when the cock is shut, as shown by the plan, fig. 4, but in all other positions of the stop-cock, the touch-hole will be closed by the cover plate; to prevent accidental discharges, the breech is open.

AMERICAN PATENTS GRANTED IN JUNE, 1829.

For manufacturing Woollen Cloth suitable for Carpeting, Floor-cloths, Rugs, Table-covers, Blankets, Padding, and other Purposes. First patented March 3, 1829. Afterwards surrendered for the Purpose of correcting the Specification, and re-issued June 11. WILLIAM HARRINGTON, *Harrison, West Chester County, New York.*

THE claim of the patentee is thus expressed:—

"I do not claim as my invention any one of the machines used in the above-described method of manufacturing woollen cloth, nor any particular part of any one of the machines; but I claim that I am the first person, who, by passing sheep's wool through the above described or similar operations, and by a combination of the above described or similar machinery, has been able successfully to manufacture woollen cloth of sufficient firmness of texture, strength, and durability, to answer the valuable purposes named in this specification, without spinning or weaving, upon the principles of felting. The subscriber is not aware that any one has heretofore been able successfully to avail himself of the well-known felting properties of sheep's wool, for the purpose of manufacturing cloth suitable for carpeting and other valuable purposes named in this specification." —*Journal of the Franklin Institute.*

For an Improvement in the manufacture of Glass Knobs for Drawers, Doors, Shutters, &c. DEMING JERVIS, *Boston, Massachusetts, June* 11.

THE glass knob, instead of being perforated in the usual manner for the reception of a metallic screw, is pressed into a mould, so made as to form the knob with a shank of solid glass, furnished with a screw. On account of the brittleness of the material the shank is made large. The claim is to the making of glass knobs, "having a glass shank, with a screw upon the shank."—*Ibid.*

For a Washing Machine. FREDUS REED, *Piketown, Bradford County, Pennsylvania, June* 11.

THE trough in which the clothes are to be washed has an iron shaft extending its whole length, supported by, and working in, two uprights. This shaft is placed above the back edge of the trough, and has on it four cranks, standing at right angles to each other. The washing is effected by four paddles, the upper ends of which are attached to the cranks, whilst their lower dip into the trough, and agitate the clothes, the back edge of the box serving as a fulcrum or thole for the paddles.

"What I claim as my invention, is, the application of the crank shaft to the paddles or arms, so as to cause them to operate alternately, as above described, said paddles not having been heretofore

employed for the washing and cleaning of clothes." And it is much to be doubted whether they will be employed hereafter.—*Ibid.*

For a Machine for Thrashing, Smutting, Winnowing, and Screening Grain, called " Davis and Carey's improved Thrashing Machine." Elisha P. Davis *and* William Carey, *Riga, Monroe County, New York, June* 11.

In general structure this machine is similar to many others, but its particular arrangements could not be shown without a drawing. The thrashing cylinder is to be covered with sheet iron, punched like a grater, with the burs projecting outwards. The hollow segment, opposite to which it revolves, is to be similarly lined: this is to cause it to operate as a smut cleaner. Spikes of two inches in length project from each, for the purpose of thrashing out the grain, which, with the chaff, falls through a screen into the winnowing chamber. A cylinder, provided with spikes, revolves, and removes the straw.

The patentees do not claim the invention of effecting either of the processes by machinery, nor any of the arrangements of parts which may be found in other machines, but only the particular combination by which all are performed in this machine. They claim the covering of the cylinder and segment with sheet iron to serve as a smut machine, and to protect them from wear. They mount the cylinder on steel points instead of journals, and this they claim. They also claim the screwing of the spikes into the cylinder and segment instead of driving them: this is to prevent their flying out. The regulating the distance of the cylinder from the segment, by means of screws and springs instead of wedges, is likewise claimed.—*Ibid.*

For an improved Method of producing Fire and Light. Isaiah Jennings, *New York, June* 11.

Sulphuric acid is to be hermetically sealed in a small glass tube or bulb, and this is to be enclosed in a paper, surrounded by a mixture of oxymuriate of potash, sulphur, and sugar, or other ingredients which will inflame by the contact of sulphuric acid. The paper may be oiled, waxed, or varnished, and folded up, to serve the purpose of a match. To light this match, the included glass is to be broken, which brings the acid in contact with the inflammable materials. The advantage presented by this plan, is, the preservation of the acid for any length of time; the disadvantage, that such matches will be too costly for general consumption.—*Ibid.*

For an Improvement in the Construction of Lamps and the Economy of Light. Isaiah Jennings, *New York, June* 11.

The lamp referred to in the specification of this patent resembles one for which Mr. Jennings obtained a patent on the 3d of March last, and, like that, is principally intended for the burning of tallow,

and other thick fatty substances. A globular body of glass is to contain the fat or oil. A copper tube of half an inch in diameter passes through a cork, fitted into an opening in the lower part of this body, and extends up so as to stand even with its upper surface, which has an opening of about 1¼ inch in diameter, so as to allow a space around the metal tube. This tube is surrounded with folds of cotton, to answer the purposes of a lamp-wick, so far as capillary attraction is concerned, but terminates about half an inch below the top of the copper tube; above this a short piece of circular wick is put on, which is to extend a little above the top of the tube, for the purpose of being ignited. There is no means of raising this wick, as it is to be renewed when necessary. The patentee has engaged to send one of his lamps for trial, when, should it justify the character which he gives to it, we will furnish an exact description of it with a drawing.—*Ibid.*

For an Hydraulic Steam-Engine. JOHN CATLIN, *Cincinnati, Hamilton County, Ohio, June* 11.

THIS is, in fact, an engine working entirely upon the principle of Savary's engine. It is said to be "peculiarly applicable to mills already erected on streams which fail during part of the year, as the expense of constructing it is much less than of an ordinary steam-engine of equal power."

Savary's engine, as usually described, was to operate both as a sucking and forcing pump. The water being first raised, by the pressure of the atmosphere into a chamber, in which a vacuum had been produced by the condensation of steam, and then forced up a rising main by the pressure of steam acting upon the surface of the water. In the arrangement now proposed, the forcing operation is the only one employed. Two or more cylinders are made of wood; and are placed in the reservoir from which the water is to be raised, so that it will flow into them without the aid of a vacuum. Wood is chosen because it is a bad conductor of heat. Floats of wood are to rise and fall within these cylinders, and are to operate as pistons; they are to be "closely fitted without touching the sides, to separate the steam from the surface of the water, and thereby prevent its condensation." After these cylinders have been filled with water, through a valve in their bottoms, steam is to be admitted into them above the float, and is, by its elasticity, to force the water to the required height. The patentee says:

"The improvement for which I claim exclusive privilege, is, the use of wood, or other non-conducting materials, to construct the vessels, or cylinders, and floats, above described, and to line with the same material iron, or other metallic vessels, or cylinders, for the alternate reception and discharge of steam and water."

It will be no easy task to *fit the floats closely without touching the sides,* so as to prevent the water from passing above them, when under the pressure of a high column in the rising shafts. The slowness with which wood conducts heat, would be an advantage in this

plan, but the impossibility of making it keep its form and dimensions under the action of water and steam, will render some unmentioned provision necessary, or it must be fatal to the whole scheme. Steam of two atmospheres will be necessary to raise water to the height of thirty feet upon this plan.

In situations where fuel is cheap, an economical engine for raising water from a tail race into a dam might be advantageously employed during seasons of drought; but it rarely happens that there is a supply in the tail race when there is a deficiency in the dam; it is therefore in but few places that such an apparatus would be of any avail; it has, however, been effected in some places, but the very nature of things forbids its frequent adoption.—*Ibid.*

For an improved Cotton Gin. Stephen T. Conn, *New York, June* 11.

The roller cotton gin consists of two rollers, about sixteen inches in length, which are made to turn something like the rollers of a flatting mill. The seed cotton being forced against these, the cotton is drawn through the rollers, and the seed left behind. Such rollers, it is stated, become heated in use sufficiently to set fire to the cotton. The improvement claimed is to the making them hollow, so as to admit air freely, which, the patentee avers, will obviate this objection. If desired, a current of air, or even of water, may be made to pass through them.—*Ibid.*

For a Cast-iron Cooking Stove. Allen *and* James Barnett, *Louisville, Jefferson County, Kentucky, June* 11.

This is an ingeniously constructed stove, and probably a very good one. The fire is placed immediately below the *upper* plate, and there are perforations in this plate for kettles, pans, &c. The oven is *below* the fire, and the flame and smoke are made to descend by four flues, one at each corner, forming a semicircular projection at each angle of the stove. These flues are carried under the oven, so as to distribute the heat equally, and the smoke at length escapes by four contiguous openings at one side, and at the bottom of the stove, where a common pipe connects them with the chimney.

The claim is to "the *projecting flues*, which render the fire department more square and compact than any other. The advantage derived from *four flues*, by which the flame or heat is drawn from the centre to each corner of the fire department, passing with great regularity under the boilers, and then descending and passing through the horizontal flues, by which it is distributed with unequalled regularity and effect under the oven, the said horizontal flues being connected, and cast with the bottom plate of the oven." —*Ibid.*

For an Improvement in the Bar-share and Shovel Plough. James Boatwright, *Columbia, South Carolina, June* 11.

A bar or plate of wrought-iron, from four to ten inches wide, and from fourteen to sixteen inches long, is to have its ends cut off obliquely, so as to form an angle of about 46 degrees with the sides: these ends are to be steeled and sharpened. This plate is to be bent in a regular curve, lengthwise, upon a cylinder of about twenty-one inches in diameter. The plate or share is then to be bolted on to the helve or chip, with one edge downwards. The specification states, that,

"Among the advantages of this improved share, the following may be enumerated. Either end may be used, or the form of the ends may be varied, so as to be applicable to different purposes; it may be used either with or without a coulter as circumstances require; it requires no mould board; is light, effective in its operation, and simple in its construction.

"What I claim as new, and an improvement in this plough, is the form of the share, which can be used at either end, and which, by its peculiar form, acts as a mould board and share, consequently supersedes the necessity of attaching a separate mould board."

This plough is said to answer well in the district of country where the patentee resides. Where the soil is light, and the ploughing is intended to be shallow, we have no doubt of its adaptation to the purpose, and this we presume is all that is expected by the inventor. —*Ibid.*

For an improved Rifle for sharpening Scythes and other edged Tools. Beriah Swift, *Washington, Dutchess County, New York, June* 11.

Emery of a suitable size is to be fixed upon properly shaped strips of wood, by means of a mixture of oil paint and varnish, which, when dry, forms the substitute for the stones usually employed.*—*Ibid.*

For an Improvement in manufacturing Wool or other fibrous Material, being a Method of taking the Wool or other Material more readily from the Doffer than heretofore. John Goulding, *Dedham, Massachusetts, June* 11.

Small rollers, covered all over with fillet card-wire, are placed in front of the doffer cylinders, from which they take the wool, and deliver it into small revolving tubes, through which it is drawn by fluted rollers. Reference is had to a patent formerly obtained, and upon which this is an improvement: figures of both would be necessary to a perfect description.—*Ibid.*

* This is a common article of long standing in England.—Ed.

For an Improvement in the Commode Knob for Drawers and other Articles of Furniture. ELIJAH SKINNER, *Sandwich, Stafford County, New Hampshire, June* 11.

THIS *improvement* consists in using turned wooden knobs, around which ferrules of brass are to be put, and circular plates of brass let into their faces, and polished. Economy is the object in view in this *invention.*

For a Machine for thrashing Grain, or other Substances, called "Fuller's Portable Thrashing Machine." GEORGE FULLER, *Gardiner, Kennebeck County, Maine, June* 11.

A HORSE, ox, or other heavy animal, is to travel upon an inclined wheel, which by bevelled gearing is to give motion to a thrashing cylinder with beaters, and also to a feeding apron, just like other thrashing cylinders and feeding aprons. The whole is to be placed upon truck wheels, so that it may be drawn about from place to place.

"I do not claim a right to the inclined wheels, or to the beaters; but I claim as my invention the particular combination of machinery attached to the inclined wheel, for moving the beaters, for the purpose of thrashing grain, &c."—*Ibid.*

For an Improvement in the Hollow Auger for tenoning the Spokes of Wheels, ABEL CONANT PEPPERELL, *Middlesex County, Massachusetts, June* 11.

AFTER the spokes of a wheel have been driven into the nave or hub, the ends which are to pass into the rim have to be rounded. This is frequently done by a hollow auger, which leave the tenons in the form of round pins; it is this hollow auger upon which improvements are now claimed. The auger is to be made in two pieces. The front piece, upon which is formed the cutting face, is so perforated from end to end, as that the hollow may be in the form of the frustum of a cone, the smaller end being towards the cutters: this is for the purpose of avoiding friction from the tenon within the hollow. The back part of the auger is solid, one end being fitted and fixed into the larger end of the conical part. The back end of the shank is squared, to fit a common bit stock, with which it may be turned. The auger is fitted into two collars, like the mandrel of a lathe; in these collars it has a traversing motion. The hub, with its spokes, are to be fixed to turn on a centre, and the spokes are brought in succession opposite to the hollow auger, properly fixed and adjusted for the purpose of cutting. There is a collet upon the shank of the auger, behind the back collar; this, when the auger has bored far enough, comes in contact with the collar, and all the shoulders are, consequently, at precisely the same distance from the centre of the wheel.

The form of the cutting edges, of which there are two upon the face of the auger, differs somewhat from that ordinarily given to it.

The claims are to making the auger in two parts: making the inside conical;—giving to the cutting edges a more curved form than usual, and the mode of supporting and using the augur.—*Ibid.*

For a machine for making Hat Bodies. HIRAM CHASE, *and* ALEXANDER CLARK, *the former of Tisbury, in Duke's county, the latter of Falmouth, in Barnstaple county, Massachusetts, June* 11.

THE wool is carded upon the ordinary carding machine, but is taken off from the main cylinder by *conical* doffing rollers, covered with cards, there being two of these doffing rollers, one under the other, in front of the cylinder, their larger ends standing in reversed directions. Steel doffing plates remove the wool from these conical rollers, when it winds around conical formers placed ready to receive it. Against these conical formers it is pressed by a second cone, which bears up against the *former*, on the side opposite to the doffing comb; this pressure gives to the body sufficient solidity, to enable it to be removed from the former.

A vibrating motion is given to the carding machine for the purpose of regulating and varying the thickness of the body. To accomplish this object, the supports of the forming rollers are not attached to the carding frame, but to the floor, by a distinct frame.

The claims are:—

"1st. The application of the two conical doffing cards, for the purpose of taking the wool from the main cylinder."

"2nd. The moving, or vibrating the carding machine, for the purpose of varying the thickness of the body."—*Ibid.*

For a Churn. COTTON FOSS, *Perry, Geauga county, Ohio, June* 11.

THIS churn is made in the form of the common dasher churn, but larger. The head is to be secured on by a cleat; a shaft passes through the head, which is to be turned by a crank, in the manner of the ordinary barrel churn; revolving dashers, placed spirally, are attached to the shaft, within the churn.

The body of the churn is to be laid upon a bench, standing obliquely, its axis forming an angle of about 35 degrees with the horizon.

The spiral direction of the floats, or dashers, and the oblique position of the churn, form the claims.

From good cream, this churn may make good butter, as quickly as other churns, and with as little waste, provided the loose head be well fitted and secured, and the cream does not escape at the shaft.—*Ibid.*

For a new and useful mode of Propelling Boats, or Waggons. JOSIAH WHITE, *civil engineer, Mauch Chunk, Pennsylvania, June* 11.

THE principal object of this invention is to use propellers of timber, to cause waggons or cars to ascend on an inclined plane, instead of drawing them up by ropes, or chains.

The propellers are long pieces of timber, placed between the ways of a rail-road. They are to be three in number, lying side by side, and may be on the same plane with the rails; they are proposed to be made of timber, about six by eight inches, and may be so joined end to end as to extend to any convenient distance; they are to be supported on rollers, upon which they are retained by flanches. A shaft crosses the rail-road, below the rails and the propellers; upon this shaft there are three cranks, from each of which a pitman passes to one of the propellers, and when this shaft is turned, by the application of any sufficient power, one of the propellers will always be advancing. The upper edges of these propellers are notched, so as to form ratchets; and three palls descend from the bottom of the waggon, and fall into these ratchets, which will, of course, cause it to ascend by a regular, continuous, motion.—*Ibid.*

For a Cider-press. Daniel Pride, *Potsdam, St. Lawrence county, New York, June* 11.

This is a rack and pinion press. Within each cheek there is an iron rack, and two pinions mash into these racks, the pinions being fixed on the ends of a shaft which crosses the press, and the gudgeons of which turn in the cheeks. This shaft carries also two cog wheels, which are operated upon by two other pinions upon a second shaft, above the former. A handspike, or lever, passing into mortice holes in this upper shaft, serves to work the press, and a weight suspended from the end of this lever, will, when wanted, keep up a continuous pressure.

We have never yet found two oak leaves exactly of the same form, and in like manner we may aver that this press does not precisely resemble any other which we have seen; still we are at a loss to tell in what part of it there is any new combination upon which to rest a claim to an exclusive right. The patentee appears to have been in the same predicament with ourselves, as he has not claimed any thing.—*Ibid.*

For a Rotary Steam Engine. David B. Lee, *and* Stephen Stewart, *Philadelphia, June* 11.

The principle upon which this engine is to act, is the same which has been tried in a great variety of forms, and always with the same result, namely, that it would go, if well made, but was inferior in operation to the cylinder engine. We cannot give the particular arrangement proposed, without drawings, and deem it sufficient to observe, that a wheel is to revolve, upon the periphery of which there are valves, which shut flush into it, and are to open and be acted upon as they pass through steam boxes, of which there are two, one standing opposite to the other, and each furnished with a steam and escape pipe.—*Ibid.*

For an Hæmagalactiphorus, being a new and useful improvement in the Method of Topical Blood-letting, and Drawing Milk from the Breasts of Women. DAVID W. D. HOUGHTALING, M. D. *and* ANDREW MENEELEY, *Mathematical Instrument Maker, Watervleit, Albany county, New York, June* 11.

THIS instrument consists of an exhausting cylinder, and a cup into which it screws. When applied to the breast, the cup is to be of such size as to receive it, when the raising of the piston will produce a vacuum. The rod, or stem, of the piston has a screw cut upon it, its whole length, and it is to be raised by a thumb screw, bearing upon the cap of the cylinder, which operates in the most gentle manner, and retains the piston in its place. The cup is made double; that is, there is one cup within another, there being a small space, say 1-16th of an inch, between them. The inner cup is perforated, all over, with minute holes: the object of this arrangement being to admit of the effect of the exhaustion being felt over the whole surface of the breast. The piston, and indeed the whole instrument, is without a valve.

When a small surface only is to be operated upon, the cup is unscrewed, and the open end of the syringe, with the piston down, is applied over the part.

The claim is to the rod and thumb screw; the double cup, and the application of the open syringe.—*Ibid.*

For an improvement in Bedsteads. JOHN P. COPCUTT, *New York, June* 11.

A RIGHT hand screw is fixed upon one end of each rail, and a left hand screw upon the opposite end; to receive these, plates, with female screws, are let into the posts. The operation is plain, and it undoubtedly was *once* a novelty; when, we know not, but do know that it has been patented more than once.—*Ibid.*

For a Washing Machine, called the "Safe Washer," for the washing of cloths and clothing, and the scouring of the same. EPHRAIM WHEELER, *Galway, Saratoga county, New York, June* 11.

SIX closely written pages contain a complete description of 'the safe washer.'

"The improvements claimed by the said inventor, to be contained in the machine, are as follows:—

"*First.* The peculiar shape of the sink as applied to the purpose of washing in this machine.

"*Second,* The operation, by pressure, of such a large cylinder, on such small ones as are contained in said machine as described, for the purpose of washing cloths or clothing."—*Ibid.*

For an improvement in the use of Flat Boilers for Generating Steam. Daniel Fanshaw *and* Horatio Hanks, *New York, June* 11.

The flat boilers which the patentees propose to improve, are thin quadrangular boilers placed on their edges, with the fire between them. There may, for example, be four such boilers, which have water pipes near their bottoms, connecting them with each other, and steam pipes uniting them together near their upper parts. The water, it is stated, has, heretofore, been forced into one of these boilers, and left to flow into the others through the water pipes. The middle boilers being the most exposed to the action of the fire, have highly elastic steam formed in them, which, by its force, frequently prevents the flow of the water into them, a circumstance pregnant with danger, and preventing the regular action of the engine. The improvement is the forcing of water into each of the boilers independently, which is said to obviate all the difficulty heretofore experienced.—*Ibid.*

For a new Pegging Machine, with plates, for making boots and shoes. Nathan Leonard, *Merrimac, Hillsborough county, New Hampshire, June* 11.

This machine consists of a press to be forced down by a lever. A metallic plate is prepared, in the form and of the size of the sole of the boot, or shoe, to be pegged. This plate is perforated with holes, corresponding with the pegs to be driven. Two other plates are prepared, one of which is furnished with awls, which are to pass through the holes in the first plate, and perforate the sole. The second plate is furnished with metal pins, with flat ends, which also fit into the holes in the first plate. When the boot is properly placed in the press, the perforated plate is laid upon the sole, and secured in its place; the plate with awls is then laid on, and pressed down; when this is removed, a peg is placed in each perforation of the plate, and that which has the pegging pins, with flat ends, drives the whoie of them home at one operation.—*Ibid.*

For a machine for Breaking and Cleaning Hemp and Flax. Reuben Medley, *Bloomfield, Nelson county, Kentucky, June* 11.

This machine is intended to operate by horse, or any other suitable power. It has a drum with three beaters, or breakers, formed of strips of wood, defended by plates of iron; after being operated upon by these beaters, the material passes from them between fluted rollers, which met each other just opposite the edge of the breast beam, upon which the beaters act. Upon the same shaft which carries the drum, and about two feet from it, there are lifters which raise a brake, with slats upon its under side, which work between fixed slats below, like the common Dutch brake. Beyond the lifters, knives, about 18 inches long, extend out from the shaft; these knives have

dull edges, which work against a spring board, upon which the flax, or hemp, is to be cleaned. The claim is to "the whole of that part of the machine which operates in the breaking of the hemp, or flax."—*Ibid.*

For an improvement in Stoves. William Naylor, *New York, June* 11.

This stove is formed in front like a parlour grate, for an open fire, and is to be used with any kind of coal, or with wood; anthracite coal being preferred. Behind the fire there is an oven, boilers, and other appendages, arranged after the manner of a ship's caboose. The whole seems to us to be compact and well arranged; its parts, however, are too numerous for verbal description.

Several very excellent cooking stoves have been invented in New York, and this, we think, will add one to the list.—*Ibid.*

For an improvement in the Plough, by which the sides of hills can be ploughed backwards and forwards, throwing the ground always on the same side of the furrow. Philip Altenderfer *and* Benjamin Altenderfer, *Richmond, Berks county, Pennsylvania, June* 11.

The specification tells us that "there is a beam with a double mould-board, pointing both ways, but both facing on the same side; two shares, and two coulters, also pointing in opposite directions, the space between the shares being closed, and also the mould-boards closed on the land side. To the above mentioned beam there is another beam [attached] which runs, or rather revolves, upon a pivot in the centre of the first mentioned beam. To the latter beam the handles are attached, and when it is desired to turn the horses, it can be done at pleasure. The upper beam is secured upon the lower by a screw upon the pivot, and by an iron pin at the end to which the handles are attached, which may be drawn out at pleasure whenever it may be desirous to change the direction."—*Ibid.*

For an improvement in the form of Boxes for the Wheels of Post Coaches, Carts, Waggons, and other Carriages; called the "Cylindro-conical, Self-wedging, or Self-fastening Box." Thomas Mussey, *New London, Connecticut, June* 11.

This is one of those simple and obvious improvements, which when once presented to us, excites our surprise that it should not have been made long ago. The improvement is upon the form of the exterior of the cast-iron boxes in common use. These have, heretofore, been cast tapering on the outside, as well as within, but in the reversed direction, and they have been so made, because, in this form, the pattern, in casting, would readily deliver from the mould. When thus cast, the smaller, or front box, has its exterior diameter smallest at the end towards the centre of the hub, or nave; the consequence of which, is, that the least start, after it has been driven into its place, loosens it in every part, and it readily comes out. The larger

box, on the contrary, has its larger diameter towards the centre of the nave, and cannot, therefore, be driven into its place, but must, necessarily, be secured by wedges, which are very apt to work out. The patent boxes are made perfectly cylindrical on their outsides, with the exception of a small distance from the end which is first to enter, where they are sufficiently tapered, or chamfered, to prevent their cutting the wood before them. The ears, or projections, which are to prevent the boxes from turning, are made sharp on their inner ends, and, when driven, force their own passage way.—*Ibid.*

For an improvement in the Cast-iron Plough. Jacob Minturn, *Urbanna, Champaign county, Ohio, June* 11.

This plough looks so much like many others, that it would puzzle an adept in the science of Lavater to discover, from its countenance, any difference in its disposition from many members of the same family. The patentee tells us that "the improvement here claimed, as aforesaid, differing from other ploughs now in use, particularly when the share joins the mould; the mould rests on the share more than twice as high on the left as what it does on the right hand side, so as to form the whole into a regular curve for turning the soil. Also, the hook projecting from the mould, and supporting the hinder part of the share; the mould also differs from others now in use, but which difference I do not claim."—*Ibid.*

For a machine for Shelling and Cleaning Indian Corn. John S. Gardner, *Canandaigua, Ontario county, New York, June* 11.

The corn is to be shelled by passing between a wooden cylinder, with projecting spikes, and a concave segment of a curve, formed of wood, and furnished also with spikes. There are springs to adapt them to each other for the varying sizes of the ears of corn. The corn is to be put into a hopper, and carried to the cylinder by a feeding apron; it afterwards falls upon a screen, which separates the grain from the cob, and a fan completes the cleaning.

There is no particular claim. and although the machine appears to be a good one, we apprehend that it is not novel in *all* its parts. The first machine for shelling corn, invented upwards of twenty years ago, had a cylinder perfectly similar to the one here described, although it was, upon the whole, a much less perfect instrument.—*Ibid.*

For an improvement in Water and Paddle Wheels. Benjamin Howard, *Worcester, Massachusetts, June* 11.

This is similar to the wheel for which a patent was obtained by Adolph Heilbronn, of New York, which is described in our last number, with engravings. The difference between them is in the details merely.

The coincidence in the particular construction of the wheels is a remarkable one. The priority in the time of application, and in the date of the patent, belongs to Mr. Heilbronn; the originality of invention is a question for others to determine.

For an improved Plough, called the 'Diamond Plough.' JOHN RHODES, *Urbanna, Champaign county, Ohio, June* 11.

THAT others may discover where the merit of the invention lies, we give the whole specification, as it is short. All the peculiarity that we perceive in it, is, that the mould board is made partly of iron, and partly of wood; it being widened out at top, by means of the latter material.

"John Rhodes' newly invented plough, differs from other ploughs now in use, as follows: The land-side and share are of wrought iron, and laid with steel; the wing welded to the bar in front, and raised so as to form the principal part of the mould, extending back to the right handle, and fastened to said handle with a bolt and screw; also a piece of wood extending from the sheath to the handle, and fastened either with a screw or rivet, and placed on the top so as to form the balance of the mould; also a bolt with a screw passing through the mould and sheath, connecting them together; the bolt connecting the beam and share together locking in the socket; the coulter being locked on the point of the share, and fastened to the beam on the land-side with a clamp and two screws. This plough may be used with or without a coulter."

For an improvement in the Construction of Fire Arms, viz: Rifles, Muskets, Fowling Pieces, Ordnance, &c. JAMES MILLER, *Brighton, Monroe county, N. Y. June* 11.

THIS gun is very similar to that of Rogers, and to Wheeler's (see page 213 in our last number.) A revolving chamber, containing seven charges, is placed behind the main barrel. Each of the perforations in this revolving piece has its touch-hole, and its percussion priming.

"The improvement relied on in this machine, consists in the simplicity of its construction, every way adapted to hunting, and for war purposes."—*Ibid.*

For an improvement in Bellows Tubs, or Cylinders, for Furnaces, or Forges. ANDREW A. M'PHARRIN, *Huntingdon, Pennsylvania, June* 11.

THE specification of this patent gives but a confused description of the invention; but the drawing is pretty well executed, and from this it appears that the part called the tub is a single cylinder, having a thick diaphragm in the middle, perforated in the centre, to allow a piston rod to pass through it, and having a double valve, closing a square hole, communicating with each division of the cylinder;

between these valves, in the thickness of the diaphragm, a nozzle, or wind pipe, passes out through the side of the cylinder. The piston rod is worked by a crank, connected with a pitman, below the cylinder; upon the rod which passes through the diaphragm, there are two pistons, one above, and the other below it, each piston having a valve opening inwards. It is evident, therefore, that the action of the cylinder, with its double chamber, is analogous to that of the ordinary double bellows, but that it must have the defect of an entire, though momentary, stoppage of the blast at every return stroke. To obviate this, there is upon the wind pipe, a cylindrical chamber, with a weighted piston, to serve as a reservoir for the wind; the loaded piston acting like the upper board of the double bellows. In the wind pipe, there is a damper, which may be closed, or opened, to regulate the exit of the wind.

We do not perceive the superiority of this arrangement, to that of other cylindrical bellows, and are very apprehensive that this patent, like many others, has been obtained by one who is not acquainted with what has been elsewhere done in his own business. The common plan of three separate cylinders, which keep up a continued blast, seems to us to be altogether superior to the mode here proposed.

For a machine for Sweeping or Cleaning Chimneys. Samuel Dow, *Elizabethtown, New Jersey, June* 11.

There is an elastic rod, made in joints, so that they may be attached to each other as they are passed up a chimney; upon the upper of these there is a block, to which the handles of four or more brushes may be fastened, so as to branch off in different directions; these handles are also elastic; the brush part is to be formed of bristles, whalebone, or any other suitable material. Just below the brushes there are attached pieces of iron, which are to operate as scrapers.

The claim is to "the machine or broom, in all its parts, as applied to the sweeping and cleaning of chimneys."

From the days of Jonas Hanway to the present, attempts have been made, particularly in England, to construct a machine to obviate the necessity of "climbing boys," and we have no doubt that upwards of fifty machines for this purpose have been offered to the public; there has been a general feeling in their favour upon principles of humanity. The one now proposed strongly resembles some of the earlier attempts in this way; these, however, and many others, with an aspect of greater promise, have been abandoned, in consequence of the impossibility of adapting them to the endless variety in the form, direction, and size of chimneys.—*Ibid.*

For an Improvement in Bedsteads. Ebenezer Rogers *and* Michael Pearson, *Essex County, Massachusetts, June* 11.

This *improvement* is similar to Mr. Copcutt's, (p. 241,) excepting that the right and left-handed screws are, as in days of yore, of

wood instead of brass. How each of the two patentees has managed to exert his mental powers on the re-contrivance of this "modern antique," it would be difficult to divine, excepting on the supposition, that one of them has invented the *right*, and the other the *left*-handed screw, it not being the mode of forming, but the mere application of these screws which they claim; they say, that "the only thing for which your petitioners would wish letters patent, is the application of the right and left-handed screws in the construction of bedsteads."—*Ibid.*

For an Improvement in the Mode of Crimping Boots. Thomas Howe, *Worcester, Massachusetts, June* 11.

A crimping-board, similar to that ordinarily used by cordwainers, has the leather placed upon it in the usual way. The crimping-board is then applied to the machine, which is the subject of this patent. This machine consists of a frame of wood, having on the upper part of it two jaws, between which the crimping-board is to be drawn. These jaws open and close by means of a screw attached to each. On the lower part of the frame there is a roller, which is to be turned by means of a crank; from this roller two chains proceed, one of which is to be hitched to the top, and the other to the toe, of the crimping-board, which has staples attached to it for that purpose. When the board is fixed between the jaws, the crank is turned, and the board and leather are consequently forced down, and the latter crimped; it is then taken out, and permitted to dry.—*Ibid.*

For a Mode of applying Heat, by Means of Iron Castings and Grates connected together, and adapted to the Uses of Cookery or otherwise, and set in a Fire-place, called a "Fire-place Furnace." Peter E. Sanburn, *Troy, Rensselaer County, New York, June* 11.

This is a kind of flat, cast-iron, box, made to fit a fire-place, and having an upper plate, upon the middle of which the fire is to be built. In the centre, just under the fire, there is to be an enclosed iron drawer, in which articles to be baked may be placed, whilst kettles, &c., may be hung over the fire, as in the ordinary fire-place. The ends of this cast-iron box, beyond the centre drawer, have their upper parts formed of bars or grating, and may have placed upon them any cooking utensil. How these are to be heated from below we do not perceive.

For an Improvement in the Manufacture of Combs. John Brown, *Providence, Rhode Island, June* 11.

It is proposed to make fine toothed combs out of small scraps of ivory, which are of little value; pieces sufficiently large to form one row of teeth, leaving a narrow back to connect them together, an-

swering the intended purpose. Two such pieces, when cut, may be joined by an intermediate piece of hard wood, horn, or any other suitable substance, to which they may be attached by cementing, or otherwise.—*Ibid.*

For making Boxes and Gudgeons of Cast-iron, Wrought-iron, or Wood, for Saw-Mills, Grist-Mills, Horizontal and Vertical Wheels, Waggons, Carts, or any Description of Wheel Carriage, whether driven by Water, Steam, Horse, or other Power. SULLIVAN REYNOLDS, *Guildford, Chenango County, New York, June* 11.

THIS imposing title precedes a claim to the use of lead for the lining of boxes or inks within which gudgeons are to run. This material has been frequently used for the purpose, and in some cases answers remarkably well, as smooth iron or steel runs upon it with but little friction. For very heavy machinery, as for the gudgeons of mill-wheels, the loading causes the lead to spread; and in machinery, where there is much jolting or percussion as in carriages, a similar effect is produced by the repeated blows. Where there is grit, it insinuates itself into the lead, and causes the wearing or cutting of the gudgeons.

We are now speaking of what we have known for more than thirty years, in part from our own practice, and in part from that of others, to whom it was then old.—*Ibid.*

For a Method of preventing Bed-bugs from ascending the Posts of Bedsteads. JAMES ALEXANDER COOK, *Georgetown, D. C., June* 13.

A CUP and socket of tin is to be placed under each post. This cup and socket is in the form of a flat candlestick, the socket part being sufficiently large to admit the post of the bedstead, and the dish part surrounding the socket serving to contain oil, water, or other fluid, over which the vermin cannot pass. A cap, like the nozzle of a candlestick, with a rim sufficiently wide to extend over the cup containing the liquid, and prevent the falling of dust into it, is fitted to the top of the socket, or on to the leg of the bedstead. The bedstead must be removed from the wall, and the clothes prevented from touching the floor when the cups are used.

The claim is to the inner socket and to the cup. The patentee calls his dishes and caps "Night Angels." A name given, we presume, because they are to keep guard at the four corners of his bed, and prevent the approach of the imps of Satan. The best defence against these nocturnal tormentors is cleanliness, and those who lack the industry necessary for their destruction, will, we are apprehensive, call in vain either upon Hercules or Mr. Cook's "Night Angels" to protect them from the fangs of these disturbers of their repose.

The effect to be produced by these *Night Angels*, we have repeatedly attained by a *magic circle* around the lower end of each

bed-post. This circle was merely a line made with chalk, over which the legion cannot pass. The loose particles upon which they tread giving way beneath their feet, and precipitating them to the lower regions.—*Ibid.*

For the manufacture of ornamental Articles of Furniture, such as Chandeliers, Lamps, Candlesticks, Mantel Ornaments, &c. FREDERIC B. MERRILL, *Buffaloe, Erie County, New York, June* 13.

SKELETONS of chandeliers, candlesticks, &c., are to be made of wire, wood, &c., and these are to be suspended in saturated solutions of alum, or other permanent salts, which, crystallizing upon the skeleton so formed, is to supply a cheap substitute for drops and other ornaments of cut glass.

Ornaments made in this way are familiar to most of our readers. The chemist has frequently exhibited them to illustrate the formation of crystals to his pupils. Ladies have decorated their mantels, and confectioners their windows, with baskets, columns, and colonnades, resplendent with the tints of the rainbow, by the reflection and refraction of natural and artificial light.—*Ibid.*

For a Fork, for digging the Soil of Gardens, &c., called a "Prong Spade." WILLIAM H. NORTON, *Middletown, Middlesex County, Connecticut, June* 15.

THIS fork is to have the general form of a spade; the number of its prongs may vary, but four is preferred. A length of about ten inches, a width of about one and an eighth inch, and an interval of about ⅞, is also recommended. The fork is to be made of steel, and brought to a spring temper; the prongs may be made rather hollowing on the face, and are to be bevelled from the back, so as nearly to form sharp edges.

This instrument, it is said, may be used in digging with much greater facility than the spade, as it is lighter, and encounters less resistance; it answers the double purpose of the spade and the fork, is not clogged by a wet soil, and may be used around shrubbery and plants without injury to their roots; it may also be used as a shovel. Such are the advantages which it offers according to the opinion of the patentee.*—*Ibid.*

For an Improvement in the Mode of representing the Notes in Music. WILLIAM C. PHILLIPS, *Lunenberg, Virginia, June* 18.

THE patentee proposes to substitute for the dots, which represent the notes upon the lines and spaces in music, the first seven letters of the alphabet, using capitals, small letters, italics, &c., to designate the value of the different notes. Letters of the same kind may be employed for the semibreve and the minum, with the addition of the

* Forked spades of this description have been in common use in England "time out of mind," and are usually employed for digging up potatoes.—ED.

same appendage which now distinguishes the value of those notes, that is, a straight line descending from the letter when used as a minum.

That the notation would be simplified by the adoption of this plan, is, we think, obvious. But in this, as in the reformation of the alphabet, there are two questions at least which present themselves for consideration—can the reformation be introduced? and, if it can, will the advantages transcend the disadvantages? Our beautiful and simple system of reckoning in federal money, will fully exhibit the difficulty of introducing new notations, or modes of reckoning. Nearly forty years have elapsed since all the fiscal accounts of the government and of our merchants have been kept in this money, and yet at the present day nine-tenths of our monied transactions are in the currencies of the respective states, although it is universally confessed to be an evil, and one, the cure of which would not be attended by any inconvenience.

A new notation in music, like a new alphabet, would have to encounter obstacles incomparably greater than that of our federal money. The written language of music is a universal one, and every musician must be able to read Handel and Mozart, or he may at once determine to "hang up his fiddle." Instead therefore of giving facilities to the learner by a new mode of writing, you absolutely compel him to undertake a double task.

The moral difficulties which interfere with the adoption of such a plan, are, in our opinion, as really insuperable as those physical ones which are the stumbling-blocks of the devisers of ever-moving machines.—*Ibid.*

NEW PATENT MACHINE FOR SCATTERING MANURE BY MEANS OF A "MANURING WAGGON."

By James Bowman, of Beaufort, South Carolina.

Every agriculturist is aware of the immense labour attending this process as it is ordinarily performed,—a labour so great as frequently to prevent its being undertaken, notwithstanding the manure may be at command. The scattering, when done by hand, is generally very irregular, the consequences of which are plainly to be seen in the unequal growth of the crop as vegetation advances. These difficulties have been completely obviated by the invention of Mr. Bowman, who has satisfactorily tested the value of his machine before applying for a patent: the facility, rapidity, and perfection with which it acts, not only excited the admiration of a number of intelligent planters in his immediate neighbourhood, who witnessed it, but far exceeded his own expectations. The plan was undertaken without the most remote idea of obtaining a patent, which was suggested only by the excellence of the instrument itself.

The engravings of the subject at Plate XV. will afford a very correct idea of the waggon, and the apparatus for scattering the manure. Fig. 1 gives a bird's-eye view of the body of the waggon, which is of the size commonly used for agricultural purposes; its sides are inclined planes, meeting the bottom at an obtuse angle. In the bottom, near the hinder axle, there is an opening made as seen at A, of about two feet in length, and eighteen inches in width.

Through this opening the manure is to pass, as it is scattered by the machinery seen in fig. 2, which represents the hinder part of the frame of the waggon to which it is attached.

B is a revolving shaft, usually made square, and which crosses the bed of the waggon at a short distance from the axle. This shaft carries ten pins, made of iron, or of any other suitable material, and extending out a sufficient length to occupy the aperture left in the bottom of the waggon, but without touching its sides or edges. These are seen at C, and also in the opening at fig. 1.

Upon the end of the shaft there is a cog-wheel, D, which is turned by a similar, but larger wheel, E, fixed on the hub of one of the hind wheels; and, of course, when the waggon is drawn forward the shaft will revolve, and the manure will be scattered. Mortise holes are represented upon the frame on each side of the shafts; these are to receive wedges, by means of which the shaft may be thrown in or out of gear. An ordinary hand can drive the waggon, and shovel the manure towards the opening, and in this way perform the labour of several strong and able men.

LAW OF PATENTS.

(Concluded from p. 185.)

We close our abbreviated account of the minutes of evidence given before the Select Committee of the House of Commons to inquire into the state of the law regarding patents for inventions by the following additions:—

Mr. Arthur Howe Holdsworth, *a Member of the Committee, being examined, stated,*

if the law be made so clear and defined that a patent for a something really useful, when taken, would be found to be secure, then I cannot conceive that we can have too many patents, as they are the reward of men's ingenuity. One man has a property in the funds, another in land, a third man in the powers of his head, evidenced by his inventions; and I conceive that if you were to attempt to limit the number, you would at once cramp men's ingenuity, and not give those who are clever their fair value in the market, because their brains are the only property which they possess. I will first state the difficulties which appear to arise on the taking out of a patent. There is nothing more common than that two persons of similar habits and pursuits should be thinking of the same thing at

the same time, and it at once becomes a race between them, as the law at present stands, at the moment that one is known to be soliciting a patent, the other man uses every means in his power to discover what the other person is about that the first may not clash with his; and if he is a dishonest man, and finds that his own is not good, that he may so oppose the other as to render that of the first person useless, unless he will agree to allow him to become a participator with him by making it a joint patent. But that is not the only difficulty in which he is put at present; there is that of intitling his patent in such a way as that other persons, not then thinking of a patent, may not be by it induced to do so; or that others, who know the value of a patent for such a subject, may not set their brains at work to endeavour to obtain one also.

The remedy suggested by Mr. Holdsworth for this inconvenience was in accordance with that of some of the preceding witnesses, the securing of the patentee from the moment of his making affidavit of his invention, and that he should be allowed any time he pleased to specify during the term of his patent.

MR. THOMAS ASPINALL, *Consul of the United States, gave the following information respecting*

THE AMERICAN LAW OF PATENTS.

The first step in the process is the payment of about 6*l.* 15*s.* 0*d.* or thirty dollars of American currency, into the patent office. The applicant obtains duplicate certificates of that payment, and takes one of them to the office of the Secretary of State, to whom, at the same time, he presents a petition applying for a patent for his invention, describing it shortly. He annexes to the specification, which generally accompanies the petition, an oath, that he is the true discoverer of his invention, and that he is a citizen of the United States; those two facts are all that is required in the affidavit. The Secretary, if there be no interfering application, immediately assents to the letters patent being granted, and the papers are then taken by the applicant to the patent office, where the specification signed by himself, and attested by two witnesses, is then lodged, accompanied with drawings; and if it be a description of a machine, also with a model, if the secretary directs it shall be so, in order that there shall be no mistaking the exact nature and extent of the invention. This whole process may be accomplished in *half a day* if there were a person on the spot to attend to it, and if the necessary writing could be made within that time. When the letters patent are prepared for signature and sealing, they are submitted to the Attorney-General of the United States, who within fifteen days, if he finds them to be conformable to the Acts of Congress on the subject, returns them to the Secretary of State, who presents them to the President for signature, and causes the seal of the United States to be affixed to them. After being recorded in the books of the proper office in the depart- of State, the letters are delivered to the patentee or his order.

Previously to a patent being granted, if there be a conflicting application, the parties are required, each of them, to nominate an arbitrator, the Secretary of State nominates a third, and this arbitration decides which of the claimants is entitled to the patent.

The right of a patentee descends to his heirs—he may dispose of it to any body without limitation. If an inventor dies previously to securing a patent, his heirs, or his devisees have a right to take out the patent after his death, in the name of the executor, or administrator, as trustee. A patent right may be disposed of to any number of persons. American patents are granted to foreigners if they have resided two years in the United States, but Congress has the power of dispensing with the two years residence by special act.

In England a patent is granted as a reward to any person for bringing an invention to the knowledge of the public, whether he be the inventor or not. In America it is granted only to the inventor. There are no patents of importation. Nevertheless, Americans are not required to make affidavit that the invention has never been made known or used in any foreign country. A foreigner is obliged to make that oath, but an American may be presumed, of course, to have originated all his inventions within his own country!

The number of American patents taken out annually is about 200. [Mr. Aspinall's estimate is very far below the actual number.] The whole official expense of an American patent is 36 dollars, but the party may, possibly, go to a lawyer, to have his petition drawn up, and to have his papers put in order, for which the highest rate of compensation there is about 4*l.* 10*s.* 0*d.* so that the whole expense of a patent would seldom exceed about eleven or twelve pounds.

The Model Office, where all machines are deposited, is at present a respectable museum.

Mr. John Isaac Hawkins being called in, and examined, gave the following information to the Committee respecting—

THE SPANISH LAW OF PATENTS.

Which is contained in a law passed by the Cortes, on the 2nd of October, 1820, and which was sanctioned by Ferdinand the Seventh, on the 14th of October, 1820. The chief points are as follow:—

The inventor of a new machine or process is entitled to a patent for ten years. The improver of an old machine can only have a patent for six years; and the importer of a foreign invention only five years. An act of the Cortes can extend the period in particular cases, not exceeding in the whole, fifteen years to the inventor, ten years to the improver, and six years to the importer. The whole extent of the patent is, to the inventor 2000 rials, to the improver 1200 rials, and to the importer 1000 rials, one half to be paid at the time of petitioning, the other half on receiving the patent; the specification to be presented at the time of petitioning. The specification is open to public inspection, except in particular cases, at the discretion of the government. Any number of partners may hold and work a patent.

IMPROVED SAWING APPARATUS,

For cutting out Buhl, and other delicate work, by Mr. M'Duff, to which was awarded Dr. Fellowes' Annual Prize, on the 2d of December, 1829, for the best machine invented by a Working Member of the London Mechanics' Institution.

Having recently had an opportunity of inspecting this valuable contrivance, which not only effects the particular object for which it was designed, (that of cutting out buhl-work, for inlaying, &c.) but is applicable to somany other important uses; we should consider ourselves as neglecting our readers, were we to omit giving a description of it. In the Report made by the adjudicators of Dr. Fellowe's prizes for 1829, to the Committee of the London Mechanics' Institution. This invention is thus described.

"The *machine* for which the prize on this occasion is awarded, is professedly for the object of cutting out buhl-work, with more facility and accuracy than by the means heretofore in use. It admirably effects its object, and it will do much more, for its use will not be limited to the circumscribed object which its inventor has designated. By this invention that invaluable engine, the lathe, adds to its multifarious uses, by simple, and not expensive contrivances, the rectilineal reciprocating action of the straight-edged saw. The advantages, and extensive applicability of such a movement, directed with a precision which the hand could never insure, the workman will at once appreciate. The inventor has accomplished his object—a novel application in mechanical power to an established branch of manufacture, by means simple, ingenious, cheap and efficacious."

The machine was produced to the Members of the Institution at the awarding of the prize, when Mr. M'Duff exhibited its capabilities by cutting out from a map of the world, the American continent, with surprising rapidity and accuracy, likewise some flowered, or scroll designs, such as are introduced in buhl-work. In this manufacture there is a very curious and interesting piece of economy practised, which we will notice in this place. Two thin plates of wood, of different colours (for instance, black and white), are glued together with a piece of paper between them, and the instrument consequently cuts them together; being thus formed of precisely the same dimensions and pattern, the design from the black plate of wood exactly fits into the aperture made in the white wood, and the white device, in like manner, exactly fits into the cavity left in the black plate, and thus two perfect varieties of inlaying are introduced by a single operation of the saw. It is obvious that by the same process three or more varieties may also be produced.

The apparatus is very compact—it is fixable, at pleasure, in two or three minutes, to the bed of any common lathe, by the simplest means. It consists, as represented, by plate XVI. of a very fine and delicate straight saw, fixed vertically, in a suitable frame, which receives a reciprocating rectilinear motion, from the rotary action of the lathe, and this conversion of the line of motion is effected by a contrivance particularly deserving of notice from its extreme simplicity and cheapness.

Reference to the engraving:—The various parts marked *a a a a* represent the ordinary lathe, and all those distinguished by other letters, apply to Mr. M'Duff's sawing apparatus. *b b* is a frame of wood, which is fixed to the bed of the lathe by two pins, or screws. *c c* are two guide wires fixed to the last mentioned, on which the reciprocating frame *d d d*, that carries the saw *e*, slides up and down. The saw is fastened at each end *f f* by the usual contrivance, attached to a frame saw, and it is distended by the action of the set screw shewn in the upper little frame *g g*. *h* is a hollow cylinder of wood suspended to the upright piece. *i* This cylinder contains a spiral wire spring. *k* The lower extremity, which is fixed to the back part of the frame at *l*, and thereby holds the reciprocating frame in suspension. It will now be evident, that when this frame is depressed by the application of a very slight degree of force, the saw *e* will make a downward cut, after which the elastic contraction of the spring draws the frame and saw up again. We have, therefore, only to describe the mechanical means by which this motion is effected with great rapidity and uniformity, through the medium of the lathe. On a cheek of the lathe is fixed a common pulley *m* which communicates the rotary motion to a similar pulley *n* beneath, by means of an endless cord *o*, which embraces them both; the spindle *p* thence communicates the motion to the wheel *q*, which has a pin *r* fixed centrically on its outer face, and to this pin is attached a cord *s s* which passes round the small pulley *t*, and thence is attached at *f* to the back of the lower part of the reciprocating frame *d d*. At *u* and *w* are brought into view the tenons and keys by which the lower appendages are attached to the lathe.

The lathe being now set in motion, the rotation of the eccentric pin *r*, gives a reciprocating semi-rotative action to the pulley *t*, and a downward rectilinear motion to the cord line *s*, and, consequently to the saw frame, which as before-mentioned, is carried up again by the elasticity of the spring. The rapidity of this action, of course, can obviously be easily varied. At *v* is a little table, on which the workman places the substances to be cut, and having both hands at liberty, he can direct the work with the utmost precision to the most elaborate parts of the design, without apprehension or difficulty. The saw passes through work of the ordinary kind almost without any sensible resistance, and the operator being, as it were, thus relieved of labour and anxiety, can exert his taste in executing work of far greater elegance than by the usual mode of proceeding.

"Of the very numerous uses to which this pretty invention is applicable, there is one which we have seen very successfully applied, which is that of cutting the wards of a key. Had we sufficient time, we should be disposed to say much more on the uses and advantages of this machine, but we will here conclude with the observation of Mr. Brougham on the subject, that *we* have 'seen a great many instruments and machines, but hardly ever saw one that was at once more efficacious and more simple.'"

LIST OF NEW PATENTS SEALED.

PUMP.—To G. Vaugham, of Cleveland Street, Mile End Road, Engineer, for a machine or pump for raising water or other fluids.—Dated 23d January, 1830. Specification to be enrolled in two months.

COTTON, &c.—To John Yates, of Hyde, Chester, Calico Printer, for a method or process of giving a metallic surface to cotton, silk, linen, and other fabrics.—26th January, 1830. Six months.

COCKS.—To G. Stocker and A. Stocker, Yeovil, Somerset, Gunsmiths, for a cock for drawing liquor from casks, which produces a stop superior to that which is effected by common cocks, and will continue in use for a longer period of time.—26th January, 1830. Two months.

SPRING LATCH, &c.—To J. Arnold, of Sheffield, York, Powder-Flask Maker, for an improved spring latch or fastening for doors.—26th January, 1830. Two months.

CARRIAGE WHEELS.—To G. F. Johnson, of Canterbury, Kent, Tunbridge Ware Manufacturer, for a machine or apparatus, which is intended as a substitute for drags for carriage wheels, &c.—26th January, 1830.

CANDLES.—To T. Bulkeley, of Richmond, Surry, Doctor of Physic, for a method of making or manufacturing candles.—26th January, 1830. Six months.

SKAITS.—To J. Cobbing, of Bury St. Edmunds, Cordwainer, for certain improvements on skaits.—26th January, 1830. Six months.

TILES, BRICKS, &c.—To S. Wright, of Shelton, Staffordshire Potteries, for manufacture of ornamental tiles, bricks, and quarries, for floors, pavements, and other purposes.—26th January, 1830. Six months.

DISTILLING AND RECTIFYING.—To R. Busk, of Leeds, York, Gentleman, for certain improvements in apparatus used for distilling and rectifying. Communicated by a foreigner.—26th January. 1830. Six months.

SHEATHING OF SHIPS.—To J. Revere, of New York, United States of America, but now of St. James's, Westminster, M. D., for a new alloy or compound metal applicable to the sheathing of ships, &c.—28th January, 1830. Six months.

IRON.—To Josias Lambert, of Liverpool Street, London, Esq., for an improvement in the process of making iron applicable at the smelting of the ore, &c.—4th February, 1830. Two months.

GLOBES.—To G. Pocock, of Bristol, Gentleman, for improvements in making or constructing globes for astronomical, geographical, and other purposes.—4th February, 1830. Two months.

COPPERING SHIPS.—To J. Gray, of Beaumorris, Anglesea, Gentleman, for a new and improved method of preparing and putting on copper sheathing for shipping.—4th February, 1830. Two months.

CANDLES.—To C. T. Miller, of Piccadilly, Middlesex, Wax-Chandler, for an improvement in making candles.—4th February, 1830.—Six months.

MANUFACTURING WOOLLEN CLOTHS.—To J. C. Daniell, of Limphey Stoke, Wilts, Clothier, for improvements in machinery for manufacturing woollen cloths. 6th February, 1830. Six months.

CLEANSING ROUGH RICE.—To M. Wilson, Warnford Court, London, Merchant, for an improved method of cleaning rough rice.—6th February, 1830.

WEAVING WIRE.—To T. R. Williams, of Nelson Square, Surrey, Esquire, for improvements in power looms for weaving wire.—6th February, 1830. Six months.

MAKING GAS.—To E. Cooper, of Streatham Place, Surrey, Gentleman, for improvements in making gas.—12th February, 1830. Six months.

PREPARING PIECE GOODS.—To J. F. Smith, of Dunstan Hall, Chesterfield, Derby, Esquire, for improvements in preparing piece goods.—12th February, 1830. Six months.

DYE-WOODS.—To J. M. U. La Rigandelle du Buisson, of Fenchurch Street, London, Merchant, for extracting dye from dye woods. 12th February, 1830. Two months.

DESCRIPTIVE ACCOUNT OF ALL THE PATENTS ENROLLED BETWEEN 20TH FEBRUARY AND 20TH MARCH, 1830.

Particularizing the Offices in which the Specifications may be inspected, with the Dates of Enrolment.

APPLICATION OF ANIMAL POWER.—To Thomas Shaw Brandreth, of Liverpool, barrister-at-law, a patent for "a new method or methods of applying animal power to machinery," was granted on the 9th of September last, and the specification was deposited in the Enrolment Office on the 9th of March, 1830.

Mr. Brandreth's invention is applicable to the moving of carriages on railways, and it is one of those which in October last were tried on the Liverpool and Manchester railway, when several locomotive engines were put in competition for a prize of five hundred pounds offered by the proprietors of the railway for the most effectual machine for the conveyance of goods and passengers. It consists of an arrangement, by which the horses employed to propel the carriages are carried along with them, and thus a speed is obtainable far beyond the limits at which a horse can exert his power. Now, as friction is the principal obstacle to motion on a level railway, and as it does not increase proportionally with an increase of speed, it follows, that in many cases much advantage might be obtained by an increase of velocity greatly exceeding that at which a horse could exert his power, or even travel without exerting power. But at the same time it must be borne in mind that the weight of the horse by this method must be added to the load which he has to move along, and that in many instances would be no inconsiderable augmentation.

A method of employing the power of horses in moving railway-carriages, on which the animal giving the power was supported, was invented by Mr. Snowden several years ago; but it has never been brought into use, or even tried on a very extensive scale. And although Mr. Brandreth's plan has been tried on a pretty large scale, the trial was not such as to prove satisfactory either that it would be beneficial or otherwise; for the stalls in which the horses worked were too small to allow them to exert their full power, and the machinery bore many marks of haste in the construction. It consists in an endless chain, *a a*, *a a*, fig. 6, Plate XVII., made of planks, about an inch and a half thick, and four inches wide, extending across the bed of the carriage, attached at their extremities to ropes, and carried over a drum, *b b*, at each

end of the carriage, one of which is shown in plan at fig. 7. To strengthen these cross pieces, and to prevent one of them from slipping down by itself, a cleat *c c* is nailed on the end of each, and extends half way across those next to it on each side: the position of these, as they pass over the drums *b b*, will best show their extent and attachments. The chain platform is supported on a series of anti-friction rollers *e e e e*. The horse is yoked to the frame, and by treading on the moveable platform drives it round, by which the drums *b b* are made to revolve, and through the medium of the spur-wheels, shown at fig. 7, put in motion the carriage wheels. When little power is required to move the machine, the spur-wheels represented in gear are employed to produce speed; but in ascents, or where much power is required, those on the other ends of the drum and axle are employed, which are so proportioned in size to each other as to admit of adjustment according to the nature of the road for which they are intended.

COMMUNICATING POWER AND MOTION.—To Lieut.-Col. Torrens, of Croydon, Surry, a patent for " certain apparatus for the purpose of communicating power or motion," was granted on the 9th of September, 1829, and the specification was lodged in the Enrolment Office on the 9th of March, 1830.

This patent is for an apparatus for obtaining power and motion from the expansion of liquids obtained from condensed gases. The chief difficulty which Mr. Brunel and others have met with, in constructing apparatus for obtaining power on this principle, was to construct vessels of sufficient compactness and strength to prevent the escape of the gas, and at the same time to permit the motion of pistons, &c. The pressure of the vapour arising from a slight increase of the temperature of the liquid of condensed gases is very great. The liquid of sulphuretted hydrogen at 50° produced vapour which exerts a pressure of 17 atmospheres; fluid carbonic acid at 32° produces vapour exerting a pressure of 36 atmospheres; nitrous oxide liquid at 45° produced vapour of 50 atmospheres; while the pressure of the vapour of ammonia at 50° is 6·5 atmospheres, that of muriatic acid at 50° is 40 atmospheres, and that of chlorine at 60° is 40 atmospheres. Thus it will be seen that very great strength is required to resist the pressure of liquid gases, and very great compactness of materials to prevent the escape of the subtle vapour arising therefrom. The method adopted by Col. Torrens for this purpose will be best

understood by reference to the sketch, fig. 3, Plate XVII., where *a* represents a strong vessel or boiler placed over a furnace, and partly filled with the liquid of condensed acid as shown at *e*, and partly by the vapour arising therefrom at *a*. This boiler is to be surrounded by oil or other suitable substance represented by *d d d*, which is contained in a strong exterior vessel, serving as a medium to convey the heat, and assisting in preventing the escape of the vapour. The working cylinder is represented at *b* with a piston *h*, which communicates the motion to any machinery through the medium of the piston rod *o*. This cylinder is also surrounded by oil under great pressure, and it is connected with the boiler *a* and a condenser *k*, by passages represented by *f*, *n*, and *i*, valves, &c., precisely similar to those used in steam engines. The condenser is surrounded by cold water, *l l*, which condenses the vapour after it has passed through the working cylinder into liquid again, which is then pumped up by the air-pump *m* into the boiler at *e*. The liquid gas is, by a powerful pump on Bramah's principle, forced through the pipe *f*, and the surrounding oil by a similar pump through a pipe projecting at the other side of the apparatus. *c* is an air vessel for equalizing the pressure. Under some circumstances it will be sufficient to place the boiler in the sunshine instead of using the furnace *r*, as that temperature will be sufficient to raise vapour of great pressure as we stated at the commencement. Col. Torrens likewise describes an improvement in packing pistons represented by fig. 4, where *a* is the piston to move in the cylinder *b*. *c c* is a hollow piston rod, and *d* an oil and air vessel attached thereto; and *e* is a coupling joint for connecting it with a pump by which the oil is supplied. The piston has packing of the usual description near its upper and under surfaces, and a space *f f* between them for oil, which is forced against the cylinder by the action of the air at *d*.

Fire-places.—To Joseph Ange Fonzi, of Upper Mary-le-bone Street, Middlesex, a patent for "certain improvements on or additions to fire-places," was granted on the 9th of September last, and the specification was lodged in the Enrolment Office on the 9th of March, 1830.

The improvements and additions here contemplated are applicable only to kitchen or cooking stoves, and they consist in a square cast-iron box, without top or bottom, represented at *a*, fig. 2, Plate XVII., placed on a brick, stone, or iron floor, with a flat top, plate *b*, extending outwards on each side for placing saucepans, kettles, &c., requiring to be kept warm, and with ash-pit door *c*. Within this box is placed the fire-grate *d*, supported on four legs. The flue

e e e e proceeds from the back of the box below the fire, so that it may be considered of the descending kind. It then passes through and communicates heat to a boiler *f* for the supply of hot water for culinary purposes, and it is afterwards conveyed through, for the purpose of communicating heat to, an oven *g*. It will be readily seen that there is much novelty in this arrangement, but the advantages of it will not be so easily discovered. Indeed, it would be difficult to conceive an oven, situated more favourably for losing heat by radiation than the one here represented; for the iron of which it is composed is permitted to give out heat on all sides, while the oven receives heat only by a comparatively small pipe passing right through it. The same objections will in a great measure apply to the boiler; indeed, the whole design is exceedingly deficient both in elegance and usefulness.

GUN-LOCKS.—To David Lawrence, of Stroud, and John Crundwell, of Ashford, gunmakers, both of the county of Kent, a patent for "certain improvements in apparatus to be applied to fowling-pieces and other fire-arms in the place of locks," was granted on the 15th of September, and the specification was lodged in the Enrolment Office on the 15th of March last.

This invention applies to locks on the percussion principle, and has for its objects, first, the protection of the percussion caps or powder and the lock from injury; and, secondly, the prevention of accidental discharges of fowling-pieces. To accomplish the first, all the parts of the lock except the tricker are placed within the stock in a recess which is covered by a protecting plate turning on a hinge at one end, and kept in its place by a spring-catch at the other: this plate is made to open for the introduction of the percussion powder or caps, which being shut in are perfectly secured from external injury. To prevent accidental discharges, these patentees employ a security pin, which fixes the tricker until it is released by the pressure of the hand against a small lever situated in the stock, and projecting about the sixteenth of an inch at the lower part where the left hand grasps in the act of firing. By this simple arrangement it is evident that no discharge can take place unless the pressure on the projecting lever and on the tricker be simultaneous, which renders an accidental discharge almost impossible.

CORDAGE.—To Captain George Harris, of Brompton Crescent, Middlesex, a patent was granted on the 15th of September, 1829, "for improvements in the manufacture of ropes and cordage, canvass, and other fabrics or articles, from substances hitherto unused

for that purpose," and the specification was lodged in the Petty Bag Office on the 15th of March, 1830.

The specification first describes a new fluid composition discovered by the patentee, which he applies to cordage, canvass, and fibrous fabrics generally, with the view of preserving them from mildew, and increasing their durability; and, secondly, a new fibrous material, for the fabrication of cordage, canvass, &c., to which also is to be applied the new composition.

The basis of the composition is obtained from "certain plants, trees, and vines," called the Ficus Indicus, which grows on the coast of Africa, and in the East and West Indies. At the proper season of the year (the wet season) incisions are to be made in the bark of these trees, whence will exude a milky fluid, which is collected in suitable vessels, and afterwards exposed to a "boiling heat," which causes the "pernicious and aqueous particles to evaporate, and thereby prevent the liability of the remaining extract to ferment." Afterwards, there is to be mixed with it in a warm state (from 80° to 100° temperature) "one gallon of cocoa-nut, palm, or other oil (not essential oil), to every twenty-five gallons of the extract." In this state it is fit to be imported into this country, where, before it is used in saturating the substances before mentioned, there is to be mixed with the composition 1 lb. of bitumen or "asphalt" to every 20 lbs. of the composition; and if this is not sufficiently liquid for certain purposes, then is to be added so much more of the before-mentioned oils as will bring it to the required consistency.

The plant from which the fibrous matter is obtained is also stated to be the native of Africa, and the East and West Indies, and is called the silk plant. The leaves of this plant are collected in the green state, then beaten by machinery (or other means) to separate the fibres from their husky envelopes. The fibres are then to be washed, dried, and sent to England. Here this new material is to be manufactured in a similar way to hemp and flax: the first process is called *hitchelling*, and the hitchelling instruments, instead of being oiled, are to be smeared with a portion of the new composition, and subsequently to the hitchelling, a further portion is to be rubbed over the fibres by hand. In the next process, that of spinning, the spinner is to be provided with a tin case, and a cloth saturated with the composition; in the former he is to dip his fingers, by which he delivers the fibres, and the saturated cloth which he holds in the other hand spreads the composition upon the yarn as it is formed. In all the subsequent steps of manufacturing the composition is applied, and the cordage so prepared is said to be much stronger and more durable than that of the ordinary kind.

The patentee describes also in his specification a peculiar method of forming the cordage for naval purposes, which, being wholly given in technical terms, would not be understood but by very few of our readers. It is also stated that canvass prepared in the yarn with this composition does not require the usual sizing to lay the *haul*, which is considered to be detrimental to it; and that ordinary cordage prepared with it need not be twisted so hard as it is usually, by which its strength is impaired.

Making Sugar.—To John Atchison, of Clyde Buildings, Glasgow, a patent for "certain improvements in the concentrating and evaporating of cane juice, solutions of sugar, and other fluids," was granted on the 15th of September, 1829, and the specification was deposited in the Roll's Chapel Office, Chancery Lane, on the 15th of March, 1830.

By Mr. Atchison's process the evaporation is conducted in vacuo by the heat from steam. The cane juice or solution of sugar is placed in a semi-cylindrical copper pan, having flat semicircular ends; on the outside of which, about two inches a part, is another pan of a similar figure to the former, the space between them being used to contain steam as a medium for conveying heat to the saccharine fluid in the internal pan. The two vessels are secured together steam tight by flanges on their upper edges, which projecting outward, serve as points of support to the double vessel, which thereby rests on the upper side of a quadrangular iron frame, constructed as a stand for the reception of the whole apparatus. Inside of this double pan, is placed a cylindrical vessel, having likewise an external case, the space between the two being also used as a steam chamber for conveying heat to the matter under evaporation. This cylindrical drum is connected by means of radiating hollow arms to a centrical hollow axis placed in a horizontal position, on which the cylinder is made to revolve at any required speed, through the agency of toothed wheels situated externally. The revolving cylinder is of such dimensions with respect to the pan, as when placed within it, for the outside of the former to be about three inches from the inside of the latter. The steam is received from a boiler conveniently situated, into the hollow axis, whence it enters a box at one end of the cylinder, form which proceeds four hollow arms; through these arms the steam passes, then circulates between the two surfaces of the cylinder, making its exit from thence, through four other hollow arms at the opposite end of the cylinder, where it passes through another central box to that extremity of the axis; thence, proceeding downward, outside the apparatus, through a curved pipe, it enters the steam chamber formed by the cavity between the sugar pan and its jacket or external case; the water produced by the condensation of the steam running off from the bottom through an open cock. As the aqueous portion of the solution in contact with the metallic surfaces is soonest expelled, the condensed saccharine matter quickly attaches itself in strata over those surfaces,

to remove which as they form and re-mix the sugar with the thickening solution, three scrapers formed of straight bars of wood are employed; these are covered with woollen cloth, and are constantly made to operate by the revolution of the axis of the cylinder: a pinion on this axis drives another pinion on the axis of a crank, from which two rods proceed, giving an alternating motion to a scraper, which continually scrapes the bottom of the sugar pan; the scraper which operates upon the external side of the revolving cylinder is fixed longitudinally over it, (or out of the range of the alternating scraper last mentioned,) and the scraper which cleanses the interior of the cylinder, is suspended from the axis of the latter, and operates solely upon the bottom, by the effect of its gravity against the surface which is constantly passing under it.

To cause a vacuum in the sugar pan it is closely covered over by a wooden case, having on the upper part a revolving fan or vane, fitted in a small circular box; a rapid rotation is given to this by a small pulley on its axis carrying an endless cord, which passes round a large pulley on the axis of the revolving crank before mentioned. The air and vapour is thus rapidly drawn off, and the ebullition is in consequence conducted at a lower temperature, there is less risk of injuring the goods. The solution when sufficiently concentrated is drawn off by a valve at the bottom of the pan.

There is much to admire in this apparatus; heat is well economised by it, and it is an elegant and scientific arrangement; nevertheless we much doubt whether it will not be found rather inconvenient in clearing out the solution, and especially the sugar which will attach itself to the hollow radiating arms, for the cleansing of which there is no provision made by the patentee. As no practical mode of effecting this object has occurred to Mr. Atchison, we would suggest to him a very simple one; which is, to put heavy metallic rings loosely on the radiating arms which would be constantly traversing their surfaces, as the cylinder revolved, and keep them clear of incrustations.

Cocoa-Nut Oil.—To John Soames, Jun., of Wheeler Street, Spitalfields, Middlesex, a patent for "a new preparation or manufacture of a certain material produced from vegetable substance, and the application thereof to the purposes of affording light and other uses," was granted on the 2nd of November, 1829, and the specification was enrolled on the 2nd of March, 1830.

The object of this patent is to secure the sole privilege of separating from each other, by a certain process, the fluid and the concrete oily matter, which exist together in the article of commerce called cocoa-nut oil, or butter of cocoa, with the view of applying the fluid portion for burning in lamps chiefly, and the concrete in the manufacture of candles, as well as those other uses to which solid fatty matters are applicable. Heretofore we believe the cocoa-nut oil has been of very limited utility, owing to its requiring artificial

heat to render the mass fluid. Lamps have, however, been constructed to liquefy this oil, in order to render it available for illumination, and two ingenious contrivances of this kind are described in the earlier numbers of this work.

The patentee's process consists in first expressing the fluid from the mass in the following manner:—The oil is put into strong linen bags, 2 feet long, 6 inches wide, and 1½ inch thick; these are covered with thick sackcloths made for the purpose, and are laid flat upon the horizontal bed of a hydrostatic press, leaving a small vacant space between the bags. Pressure is then given to them, and continued until the oil ceases to flow, and is only given out by drops slowly. This oil being received into a cistern, is allowed to stand a little time to deposit its impurities, after which it is drawn off clear, and preserved for the purposes above mentioned.

The solid portion being taken out of the bags in the press, is now to be purified from the other vegetable principles with which it is usually combined, such as fibre, mucilage, &c. For this purpose it is put into a covered boiler of "tinned copper," which is immersed in a water-bath to prevent the liability of an excess of heat; there is then added to it two parts (or two per cent.) by weight of sulphuric acid of 1·8 specific gravity diluted with six parts of water. Boiling then coagulates and precipitates the foreign matters, which may be separated by skimming, straining, or filtering, while warm in the fluid state, and by allowing them to settle in the cold state. The substance thus obtained is of a firm consistence, and forms a valuable material in the making of candles.

The patentee has judiciously limited his claim to the application of his process to *cocoa-nut oil*, for we know of no other concrete oil in which the same process had not been previously employed.

[*Want of space obliges us to defer the completion of this month's account of Patents till our next number.*]

NATIONAL REPOSITORY,

CHARING CROSS.

THE third annual exhibition of this useful institution was opened to the public on the 24th of March, with a collection of articles which if not more numerous are of superior character and interest to those constituting the preceding exhibitions. In a work like ours, which records a description of *every* patented invention as soon as it is specified in Chancery, and almost every other invention of any merit, it is scarcely possible that any annual collection of models in *machinery* can contain *many* subjects of that kind which are novel to our readers; there are nevertheless some which we have not described, and there are others which though not new to us, have been so much improved, as to require a second, and more particular notice. All these, if we can find room, we propose to describe in our next number, together with a short notice of the numerous very beautiful works of art contained in the present exhibition.

TRANSACTIONS OF THE "SOCIETY FOR THE ENCOURAGEMENT OF ARTS, MANUFACTURES, AND COMMERCE," 1829.

The annual volume compiled by this Institution having recently made its appearance, we annex a summary of its contents; to which we propose to subjoin, in our present and early subsequent numbers, more detailed accounts of those inventions or discoveries that appear to merit them.

In the Class of Agriculture,

the Society have voted rewards for two draining ploughs. To Mr. Green, the inventor of one, has been granted fifteen pounds; and to Mr. Pearson, the inventor of the other, a similar sum of money, and the large silver medal.

Mr. Green's plough, at three successive cuts, will form an open trench eighteen inches deep, half an inch wide at bottom, and five inches wide at top; and the experiments made with it have proved its effective utility.

Mr. Pearson's plough, at three successive cuts, forms a trench twenty-six inches deep, an inch wide at bottom, and ten inches wide at top. It has been in use for some years by the inventor, who has effectually drained, by means of it, a farm occupied by him at Frittenden, in the weald of Kent, to the great advantage of the land, and profit of the tenant. This important machine we shall give the drawings and description of.

The large gold medal has been voted to Joshua Kirby Trimmer, Esq., of Kew, for his flock of pure *Merino sheep,* which now amounts to 700 individuals. The carcasses of the animals as well as their fleeces have been considerably improved by his judicious care and attention. In proof of the superior quality of the wool grown by Mr. Trimmer, it is only necessary to state, that for the last two years it has been sold at three shillings and sixpence per pound.

Besides the foregoing, on the subject of agriculture, Richard Yates, Esq., of Liverpool, has communicated an interesting notice of the *plantations,* which have recently been formed *on the shore of the Mersey,* east of the town of Liverpool.

In the Class of Polite Arts,

the large silver medal was voted to Dr. Dowler, for a musical instrument called by him the *glossophone.* A short time ago was invented a little pocket instrument, generally known by the name of Eola, consisting of metallic tongues or springs set in a small frame, which, when impelled by the breath, were brought into a state of vibration, and produced musical tones of surprising fulness and clearness. Taking this invention for his basis, Dr. Dowler has adapted to it the organ mechanism. A wind-box, with which a pair of bellows communicates, is divided into as many partitions as there are tones and semi-tones: a spring is laid over each partition, and a valve, capable of being raised or depressed by its key, permits or prevents the pas-

sage of air from each partition. The instrument has a compass of four octaves, occupies but a small space, is not necessarily expensive, and will probably be found a welcome addition to our present stock of musical instruments.

The gold Isis medal was voted to Mr. Robertson for his *improved method of executing paintings in water-colours.* By a combination of processes, some original, others already known to a few artists, he has succeeded in giving to his pictures a purity of tint, and a strength and solidity of colour, which renders them almost a perfect representation of paintings in oil. A specimen was exhibited to the Society, which has been executed several years, and has been cleaned when dirty by means of spirit of wine; and neither by time, nor by the use of this menstruum, have the colours been at all impaired.

The premium of twenty pounds, for an improved method of *executing lithographic transfers,* was awarded to Mr. Netherclift, the particulars of which are given in our present number.

To Mr. Kelsall the Society are indebted for a very satisfactory account of a method of *taking casts of medals in plaster of Paris.*

In the Class of Chemistry,

the sum of twenty pounds was granted to Mr. C. S. Smith, for his *improved melting pots for iron and steel.* The superior durability of Mr. Smith's pots in standing a high and long-continued heat, rendering them of great importance in the arts, we shall insert the process of preparing them in the next number.

The large silver medal was voted to Mr. Carey, of the Navy, for his method of *preventing rottenness in ship timber.*

It had long been known that the vessels employed in the Newfoundland fishery, which take out their salt in bulk, and bring back their cargo of salted fish also in bulk, are not liable to destruction by rot. From the nature of their cargo, and the method in which it is stowed, the timbers of these vessels must be saturated with fish-oil and salt. Arguing from this notorious fact, Mr. Carey being employed, in the year 1786, to build a schooner in the Gulf of Canso, in Cape Breton, of timber green from the woods, mixed together a quantity of salt and fish-oil, and pounded charcoal, with which he filled up the spaces between the timbers, inserting here and there stops of wood to keep the composition in its place. Thirty years afterwards, namely, in 1816, Mr. Carey, being at New York, met with the owner of the schooner then lying in that harbour, was allowed to examine her, and found no appearance of decay in any part. Since that period no intelligence of the vessel or its owner has been obtained; and for want of corroboration to this important fact, the Society express their regret to be compelled to reward with their silver medal a communication, in which they would have been much better pleased to have found themselves justified in bestowing the very highest reward in their power. The importance of the subject is immense, both to the public and private shipping of the country, and the Society trust that their publication of Mr. Carey's process will induce a trial of it by some of our ship-owners.

Dr. Bostock has furnished a paper containing the results of his chemical examination of the materials that enter into the composition of *writing ink*, together with practical deductions therefrom. The secretary of the Society has communicated some observations on the domestic *manufacture of wine from raisins*, and a sample of *bone-glue*, prepared by Mr. Macqueen, has given occasion to some comparative experiments between the glue from bones and that from skin, in which the greater fluidity of the former, at a temperature approaching to boiling has been ascertained, as well as the practical advantage to be derived from this property in particular circumstances.

In the Class of Mechanics,

rewards have been granted for several inventions by seamen, having for their object nautical improvements.

The silver Isis medal has been awarded to Lieut. W. Pringle Green, R. N., for his method of working a rudder, the head of which has been carried away either in action, or by any other accident. On the broad part of the rudder, but above water, he fixes an iron yoke with two arms, from which proceed ropes through the nearest opposite ports to the steering wheel. The plan has been submitted to the Navy Board, who ordered Lieut. Green to fit a yoke for trial on board a frigate that has recently sailed on foreign service.

The gold Isis medal has been voted to Lieut. Rodger, R. N., for his *syphon for watering ships*. At present, ships of war and Indiamen stow the greater part of their water not in wooden casks, as was formerly the case, but in iron tanks. This change has superinduced another of attaching to the naval service at our principal ports, both at home and abroad, a tank vessel for the supply of water to ships of war. The entire hold of such vessel is converted into a tank, which, being filled with water, the vessel is brought along side the ship to be supplied, and the water is then transferred by means of pumps. The expenditure of time and the loss of water in this operation are considerable, and the fatigue of the men employed in such service in tropical climates is very hazardous to their health. Lieut. Rodger has contrived a syphon attached to the tank vessel, by means of which the water is transferred more expeditiously, without the least fatigue on the part of the men, and almost without loss by spilling. Of course, no novelty can be expected in the principle of action of the syphon, or in its construction, as far as the principle is concerned; but many minor arrangements, very essential in its application to this particular object, have been introduced by the inventor.

To the same ingenious officer the large silver medal of the Society has been voted for *a make-shift anchor*. By this term, in a ship-of-war, is understood any heavy article, generally a gun or the anvil, employed as an anchor when the others have been lost, or from particular circumstances cannot be got out. It is obvious that the resistance of a gun or an anvil in such a situation is little else than its

weight, as it can take no hold of the ground over which it is dragged, and is therefore likely only to retard the drifting of the ship instead of bringing her up. The happy idea occurred to Lieut. Rodger, that if six pigs of ballast were made to terminate at one end in an oblique wedge, and if they were at the same time pierced with two transverse holes to enable them to be bolted together, two of the pigs being likewise cast each with an eye for the reception of a shackle to attach the cable to, there would thus be materials at hand for the construction of an anchor, in case of emergency, capable of being put together in a few minutes, and in form bearing a close resemblance to the mooring-blocks laid down in Portsmouth harbour, which bed themselves deeply, and almost immoveably in the mud. An anchor of this kind was put together, and tried on board a frigate, and was found to answer to admiration. In two very important qualities, namely, in not being liable to be broken, and in being capable of being slung under a boat's keel while carrying out, it is manifestly superior to the common anchor, of which the numerous essential defects are now very seriously attracting the notice of naval officers.

The gold Isis medal has been voted to Mr. Reynolds for his *repeating stop to a naval sextant.* When an observation, either by day or night, has been made with the common sextant, such observation must be read off and registered before a second observation can be made; hence results a loss of time, and not unfrequently an opportunity of making the necessary number of observations to determine the ship's position, is, in cloudy weather, entirely lost. Mr. Reynolds, by adapting to the common sextant two small brass slides, each with four bolts, is enabled to take five observations in succession (each bolt registering an observation), without the necessity of reading them off immediately. The most satisfactory testimonials, by naval officers and others, respecting the high importance of this addition to the sextant, and that it does not in the least interfere with the accuracy of the observations, accompany Mr. Reynolds's communication, and justify the reward bestowed by the Society on the invention.

To Lieut. Williams, R. N., the large silver medal has been presented, for his ingenious manner of so *coupling a pair of oars* as to render them capable of being worked by a person who has only one hand. Lieut. Williams himself, by the chances of the naval service, has been reduced to this condition, and an invention, to which he was probably at first stimulated by no other motive than a desire of enjoying independently a favourite amusement and exercise, has appeared to him worthy of being laid before the Society, as offering to many similarly disabled seamen a means of earning a subsistence as ferrymen.

Commander Pearse, R. N., has furnished a paper containing directions for *cutting the jib-sails of cutters* with greater precision than has hitherto been generally practised; and J. Hall, Esq., secretary to the St. Katharine's Docks, has sent a short but very useful suggestion for an *improved method of mooring vessels* in the Thames,

whereby speed is gained, and free access at the same time obtained to every ship in the tier.

Much inconvenience and obstruction are continually taking place in the port of London from vessels, chiefly colliers, lying either at anchor or at moorings so as to obstruct the mid-channel of the river. This practice, as far as it does not arise from mere perverseness, is occasioned by the wish to get a clear birth, so as to allow free access to the lighters and other craft. But, as in the endeavour to secure this convenience, the master of every vessel is wholly regardless of the encroachment that he makes on the space which ought to be left free for navigation, some regulation in this respect is become absolutely necessary.

Mr. Hall proposes that each tier should have two mooring chains laid down parallel to each other, and 220 feet apart, estimating the average size of the vessels at 250 tons register. On these mooring chains, at 50 feet distance, should be fixed bridles, each with a buoy attached to the loose end. The depth of water is taken at 35 feet, and therefore the length of the bridle chain, allowing it to form an angle of 45° with the bottom of the river, must be twelve fathoms. The vessels are to be moored in pairs, head and stern, each vessel of a pair being fastened by a short rope of ten feet to one bridle buoy, and by a longer rope to the opposite bridle buoy of the other mooring chain. The next adjacent pair of vessels is to be moored by long ropes at one end, and short ones at the other, as the preceding pair, but with this difference, that the long ropes of one pair correspond to the short ones in the other pair. Hence the alternate pairs alone will be strictly parallel to each other, and every vessel will thus have a clear space on one side for at least two-thirds of its length for the access of lighters and other craft.

This arrangement is represented by Plate XVIII., fig. 1.

It is evident, that by adopting this plan of mooring, it would not be possible for masters to place their vessels except in proper order, whereby the present obstructions to the navigation of the river would be avoided, as well as the trouble and expense of raising the chains.

Large silver medals were presented to Mr. Mordan and to Mr. Clement for their respective *improvements connected with the turning-lathe*. Of all modern instruments the turning-lathe, in its various modifications, is the most generally useful, and is in a state now approaching to perfection. Mr. Mordan has supplied a deficiency, which still remained, arising from the difficulty of *chucking small cylinders*, so as to make them truly centrical.

Mr. Clement, by his *self-adjusting double driver*, has found the means of removing a certain degree of eccentricity, and, therefore, of imperfection, which necessarily occurs in the figure of any long cylinder suspended between the centres of the lathe, and made to revolve by the action of a single driver. Under these circumstances the pressure of the tool tends to force the work out, and to distribute the strain between the driver and the adjacent centre, so that one end of the cylinder becomes eccentric with respect to the other.

This imperfection is now removed by Mr. Clement's two-armed driver, which is also self-adjusting: by means of this, all strain is taken from the centre, and divided between the two arms, and these latter being equidistant from the centre, no eccentricity in the work can possibly occur.

To Mr. Hilton the large silver medal was given for his *pump for racking wine.* The candidate is himself a wine-merchant, and, like others in the same business, experienced the injury sustained by delicate, high-flavoured wines when racked in the usual manner, by which they are greatly exposed to the action of the air, as well as the difficulty attending the performance of this necessary operation in cellars where the casks are crowded one upon another. In order to avoid this injury and inconvenience, he employs a pump, ingeniously contrived to prevent either regurtitation, or any variation in the rate at which the wine flows from the full cask, while at the same time the mixture of air with the liquor is almost entirely avoided.

The large silver medal of the Society was voted to Mr. Davies for his *fire-escape,* which has already been described in this work.

To Mr. Cuthbert, a mathematical and optical instrument maker of considerable eminence, were awarded the large silver medal and twenty pounds, for his *improved stand for telescopes.*

In the portable astronomical telescopes, as usually mounted, the small attached telescope or finder, as it is called, is directed to the star, to be observed by means of a toothed wheel acting in rack work: this rough adjustment being obtained, the rack work of the finder is to be secured before that which directs the telescope itself to the object can be worked. If this, from inadvertence, should be omitted, the teeth of the first rack work are very liable to be broken. Mr. Cuthbert has avoided this hazard, and has at the same time simplified the apparatus, and rendered it cheaper, by substituting for the rack work of the finder a very simple friction movement, like that of the hands of a watch, incapable of being put out of order, and quite independent of the vertical and horizontal racked wheels by which the movements of the telescope itself are performed. The invention, besides avoiding the inconveniences above mentioned, has also an advantage, in point of expedition, which adds much to its utility.

The silver Isis medal, and the sum of five pounds, were voted to Mr. Parkin for his *improved French window.* Those windows that are made with folding sashes coming down to the floor are commonly called French; they serve the purpose both of a door and a window, and are often used to give ready access to a balcony, or on a ground floor to allow of egress to a garden or lawn. The chief inconvenience attending their use, is, that they do not shut so accurately as English notions of comfort require; and, in particular, when on a ground floor, that they do not sufficiently prevent the rain from driving in beneath them. To remedy this latter defect has been the aim of Mr. Parkin's ingenuity. The very act of closing the window raises a low flap, attached by ring hinges to the sill, which completely obstructs the entrance of rain. The contrivance has

already in a few instances been reduced to practice, and has been attended with the success anticipated by the inventor.

The silver Isis medal has been voted to Mr. Tindall for *a wheel with a moveable axle*, the object of which is to give greater facility to it in turning; and the sum of five pounds has been voted to Mr. Aust, for his application of a brass or copper lining to a leaden pump barrel, in order to increase its durability. The advantages contemplated by Mr. Aust are greater cheapness in the first cost, and a greater facility in attaching the barrel to the leaden pipe usually employed, by soldering the two together, than by a screwed joint with washers, &c., which is the only method whereby a copper barrel can be fixed on a leaden pipe.

A thin brass or copper cylinder truly formed, and long enough to constitute the chamber of the pump, is covered by a leaden barrel cast over it: the barrel is then drawn on a triblet, and formed into a cylindrical barrel, with a canoidal termination at that end to which the lead pipe is to be soldered.

In addition to the above, Mr. Smart has furnished a description of his *apparatus for making casks*; Mr. Bramah, of the *application of his hydro-mechanical press to a horizontal oil-mill*; Mr. James Jones, of his *method of making taps and dies for screws of a large size*; Mr. Theodore Jones, of his *wrench for round-headed screws*; Mr. Varley, of the method employed by his late uncle, Mr. Samuel Varley, of *hammering and condensing brass* for the use of clockmakers; and Mr. Robison, of his apparatus for *filtering oil.*

In the Class of Manufactures,

the sum of five pounds has been presented to Mr. Roberts for an improvement in the *loom for weaving velvet*, which, by introducing a more regular pressure, tends to give a more even face to the cloth, a character on which much of its beauty depends.

To Mr. Hughes have been awarded the silver medal and fifteen pounds for his *improved method of weaving figured silks.*

In the Class of Colonies and Trade,

the large gold medal has been awarded to Josias Booker, Esq., being the premium offered for the most successful attempt to apply *machinery worked by cattle in aid of the labour of slaves* in our American colonies. The object of the Society in offering this premium was to induce the planters to make trial of agricultural and other simple machines adapted to their circumstances; and thus to convince themselves experimentally that of all the modes of performing agricultural operations, and bringing the rough produce into a marketable state, the labour of slaves is by far the most expensive and unprofitable. A farther object was to mitigate the situation of the slave, by transferring the severest labour to cattle and machinery.

Mr. Booker's communication, in claim of the premium, is a simple and very interesting detail of the gradual adoption by him of cattle labour and simple machinery, in aid of negroes, in cultivating a cotton plantation at Demerara, and preparing the produce for ex-

portation. On many kinds of work the saving of expense amounted to no less than fifty per cent.; and as this took place chiefly in the most laborious departments, namely, by the substitution of the plough for the hoe, and in working by cattle the machine for ginning the cotton, the situation of the negroes was proportionally amended, not only by diminishing the sum total of labour to be performed, but by making that diminution to fall chiefly on the most oppressive forms of it. What is better still, Mr. Booker's wise humanity was not confined within the bounds of the estate committed to his management, but his neighbours had the discernment to see the advantage that he was deriving from it, and the good sense, in several instances, to follow his example. May the good seed that has thus been sown grow and prosper; and may the Society have the satisfaction of bestowing more medals for this object, and of recording the names of those whose enlightened good sense has demonstrated that the interest of the master is inseparably connected with the content and ease of his bondsmen.

IMPROVED LITHOGRAPHIC TRANSFERS.

By Mr. Joseph Netherclift, of No. 8, Newman Street.

Lithographic drawings were originally made with a peculiar ink, on paper covered with a coat of size, and were then transferred to the stone by warming this latter, laying the drawing on its face downwards, and passing both through a rolling press. Hot water, by means of a sponge, or in any other convenient way, was then applied to the paper, till the coat of size on which the drawing had been made was reduced to a soft, pulpy state, which allowed the paper to be stripped off, leaving the drawing fixed, by the previous pressure and heat, to the face of the stone.

Many advantages attended this original method, compared with that which has now nearly superseded it, namely, making the drawing on the stone itself; for, in this latter mode, the artist works on a cumbrous, unportable slab, and is obliged to make his drawing in an inverted position; whereas, by the use of prepared paper, he had a light and portable material, together with the great advantage of making his drawing in a natural position, which, being that to which artists are accustomed, the work was free from stiffness and constraint.

The objection to the method by transfer, was, that the lines were coarse, and only adapted to free sketches, being deficient in that fineness and precision required in most works of art, especially those intended for illustration of objects of natural history, or as specimens of the higher departments of art. The drawings of all such objects are made on the stone itself. The society, conceiving that it would be a great point gained so to improve the ink and paper, and generally the whole method of making lithographic trans-

fers, as to render it applicable to most of the purposes for which drawing on the stone is now had recourse to, offered a premium with this object, which was successfully claimed by Mr. Netherclift. The society do not suppose that Mr. Netherclift's process is incapable of improvement; but, from the specimens produced before them, and from the unanimous testimony of several very competent judges, they believe that the process which they now make known will be found to produce work of a very superior quality to the lithographic transfers which have hitherto come under the notice of the public.

Composition of Materials.

The transfer paper is thus made:—

Take the proportions as follow:—A quarter of a pound of tapioca and arrow-root; boil them separately into a paste, and then unite them, and pour sufficient hot water to make the whole a thin paste, which must be strained through a muslin rag: add to the above a quarter of a pound of flake white, well ground in water previously, and stir it in with the paste. The paper, either thick or thin, should be rather porous, or what is called half-sized paper. First, with a flat camel's-hair brush lay a coat of common size on the paper, and let it dry in; then lay on the paste in the most careful and *even* manner *thrice* following, but dried between each time of laying on. Thus the whole surface will be properly covered: if there should be any part omitted, the work on it will be imperfect. As soon as the paper is dry, it should be either well *cold pressed*, or sent to the glazing-mill and flatted between iron rollers which clears the surface, and the glazed part should be on the back side of the paper, which is done by rolling two sheets together face to face. The work on the paper is, if fine, executed with a steel pen, as the specimen herewith sent, the dark parts with a common crow-quill.

The ink is composed of equal quantities of yellow soap and shell-lac, boiled and burnt together, with lamp-black sufficient to make it black, which forms a cake, to be rubbed up as Indian ink with warm or cold water. I prefer to use no tallow or bees'-wax, and am prepared to shew that the art of lithography, as connected with ink-work, is not founded on the opposite qualities of acid and grease; for the above ink requires no acid to neutralize the alkali of the soap, the grease of which is fixed by the extreme quantity of shell-lac. Thus the acid is avoided, and the lines are not so liable to be injured. In extreme cases, however, where a mass of shade is condensed, a little acid may be used with effect. Nitric acid, diluted with water, is the proper requisite.

The act of transferring is easy:—Let the stone be moderately warmed; damp the back of the paper on which the work has been executed till it lies perfectly flat; take care no *wet* touches the work; lay the paper carefully on the warm stone, and on it lay flat soft paper, which will absorb the wet on the back of the transfer paper. Pass it through the press three or four times with increased pressure, after which this paper will peel of, leaving the composition as

well as the drawing on the stone. Wash off the former, and rub the drawing over with a strong coat of gum-arabic water. Lay it till cold, and print.

AMERICAN PATENTS GRANTED IN JUNE AND AUGUST, 1829.

For a Mode of ascertaining the Weight of Goods, or other Loading, in Boats, or other Water Craft. THOMAS COHOON, *Troy, New York, June* 18.

TUBES are to be fixed on the gunwale of the boat, or in any other convenient part. These tubes are to stand vertically, are to be open at both ends, and their lower ends dip into the water. Floats, with graduated stems, are used to ascertain the height of the water in these tubes: these stems having been once graduated, by actually loading the boat by tons or half tons, will ever after indicate the weight of the loading. The floats may be made of any buoyant material, as of cork, hollow balls of metal, &c., and when the load is unequally distributed, the measurement may be taken in different parts of the vessel.*—*Journal of the Franklin Institute.*

For a Mode of manufacturing or forming Hat Bodies of Wool by Machinery. LEVI VAN HOSEN, *Norwalk, Fairfield County, Connecticut, June* 19.

THE general principle upon which this machine acts is similar to that of several others which have been patented. The wool is taken from the doffer of a common carding machine, and wound upon cylinders with rounded ends, or upon cones, so as to form the bodies. The particular claim in this machine is to the mode of vibrating the sheet of wool, as it winds upon the former, so as to cross the fibres, and cause them to felt well, and of forming from one to six bodies at the same time, according to the width of the carding machine.—*Ibid.*

For an Improvement in Canal Passage Boats. JACOB BROMWELL, *Cincinnati, Hamilton County, Ohio, June* 23.

A MOVEABLE roof, forming an awning, is to be constructed above the ordinary roof of a canal boat: this roof is to be capable of sliding down, so as to coincide with the fixed roof when the boat passes under bridges. To effect this, the standards or stancheons, which support the moveable roof, pass into hollow columns or boxes. Weights, passing over pulleys, serve as a counterpoise to the moveable roof, and suffice to sustain it when not pressed down; or the same effect, it is stated, may be produced by springs. There are

* This obvious mode of ascertaining the weight of cargoes has been practised in England.—ED.

two pieces of tough hard wood, hinged to the front edge of the moveable roof, and at the other end to the bows, or some forward part of the boat; these are to form inclined planes, which, when passing under bridges, are to press the moveable roof down.

The object of the invention is the accommodation of the passengers, who, under the protection of this roof, may view the country through which they pass without annoyance from the sun or rain. They must *look out*, however, in passing bridges, or the roof may prove a "dead fall." It may be well to recollect the poor Frenchman, who, when the captain of a canal boat cried "look out," as they approached a bridge, nearly suffered decapitation by literally obeying the order.—*Ibid.*

For a Mode of cutting out Boots and Shoes by means of a Scale or graduated Pattern. SAMUEL MARSHALL, *Philadelphia, June* 23.

THE pattern used by Mr. Marshall is usually made of copper, and bears a strong resemblance to that for which a patent was obtained by Mr. Thomas Howe, of Massachusetts, on the 18th of April, as noticed in our last number. It appears highly probable that both these gentlemen have adopted analogous modes of procedure independently of each other.—*Ibid.*

For a Cooking Stove for burning Lehigh and other hard Coal. CORNELIUS SCHERMERHORN, *New York, June* 23.

JUDGING from the drawing and description we should think this stove well adapted to its purpose. At all events, it is distinctive in its character, the structure of the stove, and the management of the fire, differing essentially from every other which we have seen.

The body of the stove is a rectangular iron box, closing in front with folding doors. This box contains a sliding grate or furnace. In the drawing accompanying the specification, the grate is represented in the form of the ordinary Lehigh coal grate, with open bars in front. The box, in which the grate is contained, is in length and height just sufficient to receive it, but in depth, from front to back, about three times that of the grate. A bar or rod projects forward, by means of which the grate, which slides upon ledges, may be drawn forward, or pushed towards the back of the containing box. The top of the box, in front, is perforated to receive boilers, &c.; under which the grate may be drawn, whilst at the same time roasting may be effected in front of it. The back half of the box is surmounted by an arched oven, formed of double plates, to allow a passage to the escape pipe. There are sliding dampers, and other appendages, which appear to be ingeniously contrived and likely to operate well, but which we shall not attempt to describe.

The claims are to "the sliding furnace acting directly on the boilers, and all parts of the oven; and likewise the ventilators preventing a too intense heat upon the bottom of the oven plate; also the portable slide or damper, and the construction of the double flue."

For an improved Churn. Abner Murray, *Athens, Bradford County, New York, June 27.*

This churn is to stand vertically; its dasher consists of one flat board, revolving on gudgeons, and reaching each way to within two or three inches of the sides of the churn. Stationary slats are fixed within the churn, extending from the bottom to the top; they are fastened by one edge to the staves, and are sufficiently wide to reach within half an inch of the dasher; of these slats there may be two or more. The upper gudgeon of the dasher passes through the top of the churn, and has on it a bevelled wheel, which is turned by a second bevelled wheel, fixed upon a horizontal axis, and moved by a crank.

The claim is to the "placing from two to five slats or breaks perpendicularly, at equal distances apart, inside of the churn, to set between the joints of the staves, standing edgewise, towards the centre of the churn."—*Ibid.*

For an Improvement in manufacturing and ornamenting of Combs. Ebenezer Mustin, *Philadelphia, June 27.*

This improvement in the *manufacturing* and ornamenting of combs, consists in drawing any device or ornament upon the tops of combs with gold size, and the laying on of gold, silver, or other leaf, or bronze. This process is the same that is practised upon chairs, and an infinite variety of ornamented articles; the *invention* or *discovery*, therefore, consists in doing that upon combs which has in itself no novelty whatever. The whole specification might have been comprised in the words, "I claim a patent for ornamenting combs by gilding." Query, is this "a new and useful improvement on any art, machine, manufacture, or composition of matter, not known or used before the application?"—*Ibid.*

For an Improvement in the Mode of stiffening Hats. Jonathan D. Wilson, *New York, August 6.*

The rim of a hat, and the top of the crown, are to be stiffened in the usual way, whilst the part between is to be left without stiffening of any kind. A piece of buckram, or other stiff substance, is made to fit within the hat, the lower edge tucking under the sweat leather, and the other extending up to the crown. When this is removed, the hat may be flattened down, and put into a trunk, and, when replaced, the hat will resume its usual appearance.

The inside stiffener constitutes the claim.—*Ibid.*

For preserving Apples and other Fruit, Beets, and sweet Potatoes, and other Roots. Amos Hart, *Wharton, Fayette County, Pennsylvania, August 10.*

The mode proposed is to pack the fruit or roots, in dry pulverised charcoal, contained in well-seasoned wooden vessels.

The use of charcoal in preserving animal matter, and in destroying the putrescent odour and taste of the most filthy water, is well known, and we have no doubt that the same article will tend to preserve vegetables from decay. We apprehend, however, that the soiling effect of fine charcoal dust will prevent its extensive use, excepting, it may be, in packing fruits, &c., for exportation.

For an Improvement in the Business of Ferrying and Draying. LUNENBERG C. ABERNATHY, *Boone County, Kentucky, Aug.* 18.

A PADDLE-WHEEL, like that of a steam-boat, is to be placed on one side of a river, and is to be driven by the current. The shaft of this wheel carries two cog-wheels, which may alternately be made to engage in a wallower, and turn it in opposite directions. On the same shaft with the wallower there are two drums, to each of which one end of a rope is to be fastened, and around each a portion of it is to be coiled: this rope is also to extend double across the river, and pass round a pulley on its bank. To the middle of this rope the ferry-boat is to be attached, when it may be sent over, and returned by a man who attends the wheel, and engages and disengages the wallower.

The same apparatus is to be attached to a dray, or other carriage, to draw goods from or to a warehouse near the banks of the river. The whole plan, we suppose, being considered as new, no particular claim is made.—*Ibid.*

For a Machine for packing Cotton. OBADIAH STITH, *Laurenceville, Brunswick County, Virginia, August* 25.

EACH cheek of this press consists of two bars of iron standing upright. They are framed into a bed-piece, and stand at the distance of a few inches apart, to allow a piece, called a driver, to extend out between them. These iron bars are perforated with round holes, to receive pins which serve as fulcra, upon which the levers work which are to force the driver and follower down upon the cotton. The cheeks are placed apart at a distance equal to the length of the bale to be packed. The levers, of which there are two, are each twenty feet long; they have a mortise in the middle, to allow them to pass up and down on the iron cheeks at each end of the press. The levers are to be drawn down at each end alternately, the pins placed in the holes of the bars being shifted as they descend. The sides of the press are boxed up to receive the cotton, which is put in at the top. When the levers are at the upper end of the cheeks, the driver falls on one side, and offers no obstruction to the introduction of the cotton. An iron strap or stirrup, from each end of the driver, connects it with the levers, descending into the centre of the mortises, where it is secured by strong pins, upon which it works as a joint.

We shall probably recur again to this press, as it is certainly more simple than many of those which are used for the same purpose, and we think that it will be found convenient in practice: should this

appear to be the fact, an engraving shall hereafter be given for the purpose of making it better known.

The general construction of the press is claimed, as is the particular mode in which the levers are to operate; the iron cheeks with the slot between the bars which compose them, and which allow the driver to be drawn down by the levers; the application of the stirrup and driver are also claimed.—*Ibid.*

For an Improvement in Canal Boats. THOMAS W. BAKEWELL, *Cincinnati, Ohio, August* 25.

THE object proposed to be accomplished in the improved canal boat, is, to fix an awning above the roof or top of the cabin, which awning may be lowered to admit of passing under a bridge. A patent for a contrivance for the same purpose was granted to Jacob Bromwell, of Cincinnati, on the twenty-third of June last, and is noticed at p. 274. The support of the roof or awning, as described by the present patentee, is to be constructed of light pieces of timber, so framed and jointed, that they may double down upon the permanent roof, upon the principle which regulates the approach of the two sides of a parallel ruler, as will be seen by the claim, which is "the application to canal boats of the forementioned principle, which principle is that on which the parallel ruler is made, and by which a rectangled parallelogram may become a rhomboid, and *vice versa*, the sides remaining unchanged."

It is proposed, as in Bromwell's patent, to render the awning self-acting, by a projecting piece, properly fixed, to strike against the bridge, and press the framing down; it may also be made to rise spontaneously by a weight acting over a pulley, or by other means.—*Ibid.*

SPECIFICATIONS OF AMERICAN PATENTS.

Specification of a Patent for some Improvements in the Boilers of Steam Engines. Granted to ANTHONY HERMANGE, *Baltimore, Maryland, November* 26, 1828.

To give a sufficient description of my improvements in steam boilers, it will not be necessary to enter into an account of steam boilers now in use, as they are, of course, very various, and well enough known to distinguish them from my modes of construction. The boiler itself, with regard to its outward contour, I will make of any convenient shape. As convenient a one as any will be to have it of a cylindrical form, or of that of a parallelopiped; or this last surmounted by a half cylinder; or of a prism, whose base is a hexagon; of a cubical, or indeed of a variety of forms. I will place the fire-place, and flue, and fuel-pipe, (where I have

one especially for that purpose, particularly when the fuel to be used is coal;) inside of the boiler, disposing of them in such a manner, that when the proper quantity of water shall be in the boiler, they shall be below its surface. This will secure the advantage of having the water almost entirely to surround the fire-place, flue, and fuel-pipe, where this last is employed. The flue, particularly, shall be lengthened out inside of the boiler in a variety of ways, in order that it should present an extensive surface in contact with the water, and that the heat evolved in the fire-place, should thus, by means of the heated air freely circulating through the lengthened flue, be all, or nearly all, communicated to the water before the flue passes out of the boiler. The flue will, in this manner, have an effect somewhat analogous to that of a reverberatory furnace. I said the flue may be lengthened out in a variety of ways; it may, for example, go from the fire-place perpendicularly upwards for some way, then form an arch, and return vertically downwards, and have its exit from a convenient place in the lower part of the boiler, or thereabouts: this would be one of the simplest methods. After ascending as before, the flue may have a tortuous or spiral disposition downwards, and have also its exit as before. The main flue may also, above, be divided into two, three, four, or more smaller flues, as convenience may dictate, and these again may be connected together in the bottom part of the boiler, or towards the bottom, for their exit from the boiler, by a single flue or more; from the fire-place the flue may have a serpentine form in the boiler, and have its exit at any convenient place. In fact, it will readily be perceived that a variety of modes may be adopted. The fire-place I will construct of any convenient form, and place it in any position that the easy introduction of fuel, or any other such circumstance shall require. It may, for instance, be placed at the bottom of the boiler, with a grate opening into a wind-box below the boiler; in this way the fuel-pipe may communicate from the side of the boiler, at an angle from the horizon, sufficiently inclined to permit the fuel to fall with facility into the fire-place. This would be an excellent disposition when the fuel to be used is coal; a coal-receiver, with two sliders or doors, may thus be adapted to the outside end of the fuel-pipe, in order that, at the instant of supplying fuel to the fire, the heated air in the fuel-pipe may not be suffered to escape. When the fuel is to consist of wood, it would, no doubt, be better to have the fire-place opening, for the reception of the wood, on the side of the boiler, or the end of it, by means of a door a little above the bottom of it, so that the water may also come in contact with the bottom of the fire-place. In this way, also, there may be practised, if convenience requires it, an opening through the bottom of the fire-place, (across which a grate may be placed, through which the ashes may drop,) communicating with an opening through the bottom of the boiler, which may there have a wind or blast-box

attached to it. It will be perceived that the arrangement may be various. As in the combustion of the fuel, with regard to boilers in common use, much of its inflammable substance passes off in the form of dense smoke, &c., without entering into a perfect state of combustion, I will employ bellows (conveniently adapted for the purpose, and which may, of course, be worked by the engine itself,) for the purpose of keeping up a constant current of atmospheric air through the ignited fuel, and to keep up the current of air thus heated throughout the course of the flue. As the air, in approaching towards the exit of the flue from the boiler will become cooler, and, of course, from its increased density be of less volume, it will be well, ordinarily, to diminish the flue gradually as it approaches its exit. I will avoid bringing the fuel-pipe (where one is used), or the flue into that part of the boiler occupied by steam, for the following reason: the fuel-pipe and flue, having a direct communication with the fire-place, would, of course, always be filled with air intensely heated, which would be extremely likely to keep them in a red hot state; in this condition, being in contact with steam, a constant decomposition of portions of the steam would take place; its oxygen combining with the metal would rapidly corrode it, to the evident danger, after a little use, of the bursting of the boiler; whilst hydrogen gas would be extricated, during the progress of decomposition, which might interrupt the free and secure motion of the rest of the machinery of the engine. For the purpose of ascertaining always the height of the water in the boiler, I will make use of any description of water-gauge that may be adapted to ordinary steam boilers: a very good one will be to have two short pipes accurately inserted into the boiler; one into that part occupied by the water, and the other into that containing the steam; and the communication with both formed on the outside of the boiler, by means of a strong glass tube: in this way the height of water may always be determined by sight. A stop-cock may be used, but will not, of course, be so convenient as the water-gauge above. It would be well to have the steam-pipe going off from, or near, the most elevated part of the boiler: this will be a matter of convenience. For supplying the boiler with water, I will make use of any of the ordinary means. The pump for the supply of water may be so managed as to have, at will, a longer or shorter stroke, according to the demand of the boiler for water. In the construction of these improvements, I will employ any description of metal in common use for steam boilers, but I need not add that copper would be the best. The blast-box, where one is used, will, of course, vary in its structure, according to the most suitable adaptation to the boiler, as well as the bellows employed. The wind-pipe of the bellows may either be adapted to a blast-box, or may be moveable, so as to pass through a hole made in the door of the fire-place (where there is a door), or permanently fixed under the door, or at its side, or indeed in any

other convenient situation. As for the fastenings, or other modes of adapting the several parts of the boiler, &c., together, I need hardly mention that I will adopt any convenient modes now in common practice in similar cases.

After the exit of the flue from the boiler, it may, if thought proper, be carried through the water tank or vessel, destined to keep up the supply for the boiler, for the purpose of heating it before it is pumped into the boiler. No doubt most of the principles laid down in the preceding descriptions have, taken separately, been heretofore known; but I claim as my own the combinations of principles therein stated.

Description of the Drawings—Plate XVIII.

Fig. 2 is a vertical section showing the internal structure of the boiler, &c. The fuel fitted for a boiler made in this way would be coal.

a, the fire-place.

b, the grate.

c, the blast-box, with a slide or door at the bottom.

d, the wind-pipe of the bellows.

e, the fuel-pipe.

f, a sliding door, shutting the fuel-pipe, and, when opened, permitting fuel to drop down from the fuel-receiver.

g, another sliding door, stopping the communication from the open air when the slide *f* is open.

h, the fuel-receiver or box.

i, *i*, *i*, space of the boiler occupied by the water.

k, space of the boiler filled with steam.

l, steam-pipe.

m, water-gauge.

n, *n*, *n*, flue-pipes: there may be four, more or less, passing down through the bottom of the boiler, and ending in a single larger flue-pipe.

Fig. 3 represents the bottom of the boiler pierced by the flue-pipes *n*, *n*, &c.—*b* is the grate at the bottom of the fire-place.

n', is a larger flue, forming the exit from a flue or heat-box below the boiler; *n*, *n*, open into this flue-box, after having pierced through the bottom of the boiler.

Fig. 4 represents *n*, *n*, passing into flue-pipes, instead of passing from the boiler into a flue-box below. These flue-pipes, *p*, *p*, communicate with *n'*; they might, if convenient, be placed under the boiler.

Fig. 5 is a middle section of a boiler in the form of a parallelopiped, surmounted by a half cylinder. This is an excellent mode when the fuel is wood. When similar letters to those in fig. 1 are used, they represent portions of the boiler, &c., intended for similar purposes. The dotted additions to the figure

(*b*, *c*, *d*,) show how a grate, wind-box, and the wind-pipe of the bellows may be adopted.

o, is the door of the fire-place.—*Ibid.*

Specification of a Patent for a Machine for Ditching, or excavating Ground for Canals or other Purposes. Granted to GEORGE HENRICKS, *Urbana, Champaign County, Ohio, August* 5, 1829.

I MAKE a carriage or frame with four wheels, the front wheels being made and fixed in all respects like those of a common waggon. Under the body of the carriage, a plough, with the mould-board, of any of the known forms, is fixed so as to extend along between the hind and fore wheels, the land-side of the plough standing in a line with the centre of the bed of the carriage or frame, so that the mould-board may reach nearly to one side; it is also to be depressed sufficiently below the wheels to turn up the required quantity of earth. In order to remove the earth as it is turned up by the plough, there are a number of elevators or boxes, made usually of strong sheet iron, somewhat in the manner of the elevators of a flour-mill, but much larger. These elevators are attached to each other, so as to form an endless band or chain, the boxes being connected to each other by means of strong links. These elevators are made to revolve by passing them round two revolving shafts or rollers, one of which is fixed as near to the mould-board of the plough as will allow the elevators to pass round: this stands longitudinally with the carriage and plough. The other roller is fixed by proper frame-work above, and extending to a distance beyond the side of the carriage. When this chain of elevators is made to revolve as the carriage is drawn forward by horses or oxen, the earth which is ploughed up is received into the elevators, is by them raised and carried beyond the side of the ditch, so as to be delivered or thrown upon the bank, or it may be thrown into carts, or on to stageing, in the digging of canals.

In order to cause the shafts to revolve, upon which the excavators are sustained, the lower of these shafts is geared to one of the hind wheels, from which teeth or cogs project inwards, so as to take into teeth or cogs, which form a trundle upon the end of the shaft, the planes of these wheels or trundles standing at right angles with each other. The shaft I generally make square, so that the flat sides of the elevators may exactly fit them on each face as they revolve. If made round, spikes must project from them in such a way as to check the elevators, and prevent their slipping round.

In order to insure the turning of that wheel of the carriage to which the shaft is geared, its periphery or rim has a number of projecting spikes of iron to lay hold of the ground, as, without these, it would slide instead of turning.

What I claim as new in the above-described machine, is, the use of the elevators, plough, rollers, and gearing, in the manner described. And I do hereby declare that the foregoing is a full and clear description of my said machine.—*Ibid.*

ON THE FUSION OF TALLOW.

THE Council of Health at Nantes has been engaged in an investigation of the best means of fusing tallow, so as to avoid the injury and annoyance which arises from an abundant liberation of vapours when the ordinary method is used. Much pains has been taken in acquiring all the information possible, and numerous experiments have been made both on a large and small scale. The best process which the council has instituted, appears to consist in using, according to M. D'Arcet's suggestion, a certain proportion of sulphuric acid, and operating in close vessels. By the use of the acid, the fumes always evolved are very much altered and ameliorated in quality, at the same time that the fused tallow is improved in quality and increased in quantity, the fusion very much quickened, and the use of a press dispensed with. By the use of close vessels the fumes evolved can be either conducted to a fire-place to be burnt, or, if that may be thought dangerous, in consequence of the occasional boiling over of the melted tallow, can be conducted into a condensing apparatus, which is found readily to condense them.

M. D'Arcet uses 100 parts of crude tallow in small pieces, 50 parts of water, and one part of sulphuric acid, sp. gr. 1.848. In some small experiments a digester was used, having a pierced copper plate near the bottom to avoid the necessity of stirring; 1500 (316.5 oz.) parts of crude tallow, 750 of water, and 124 of oil of vitriol, were used, and the fumes conveyed by a pipe into a fire-place, half an hour's ebullition completed the fusion. The infusible matter, when pressed into a cloth, weighed only 96 parts, and was slightly acid. The tallow was white, hard, and sonorous, and *not* acid. Without the acid the same effect was not produced in an hour.

A tallow manufacturer then tried the experiment with two cwt. of tallow, using the acid, but operating in open vessels; 92 per cent. of fused tallow was obtained, and 8 of loss occurred. In a second large experiment with acid only 5 of loss occurred. The residue does not require the use of a press, but cannot be made into cakes for cattle unless previously freed from acid by washing.

Experiments made on the condensation of the vapour were found to succeed very well, and thus all fear of injury from fire is avoided. The council propose conducting the vapours into the

drains of the works, and so condensing them there—no annoyance being apprehended from the occasional return of the vapours into the building, as that effect can be counteracted by the use of stink-traps.—*Annales de l'Industrie.*

Remarks by the Editor of the Register.—If the above statement includes all the information furnished by the council, it is an exceedingly partial one, as it represents only what a merchant would call the *creditor* side of the account. In order to decide upon the eligibility of the plan, the cost of the sulphuric acid, the extra cost of suitable *close* vessels, the waste of the residuary cake, &c., must be put on the *debtor* side; and it is then questionable how far the operators might prefer working, exposed to the fumes of sulphuric acid, without noticing the occasional sprinkling of the acid over their persons and clothes. Query, if properly-constructed furnaces and flues, to carry off the pernicious vapours, would not alone prevent the public from being inconvenienced by the tallow-chandler's process?

HYDROPHOBIA.

SIR.—In all diseases, hydrophobia not excepted, prevention is better than cure. It is well known to practitioners in the diseases of dogs, that this dreadful malady chiefly proceeds from the savage custom of dog-fighting; while some of the best informed of these authorities even go so far as to doubt any instance of its spontaneous existence, or without the bite of a rabid animal at some period or other; and it is, it appears, classed with some other disorders which are only produced by communication, where the punishment of vice seems the object nature had in view. It is not, as may be seen from these observations, supposed that by the mere fighting of healthy dogs hydrophobia is created; but the complaint it is known frequently lies dormant and never suspected till discovered by its dire effect. Besides which, an habitual ferocity and propensity to biting is excited in dogs by frequent combats, which is the cause of their becoming mischievous when in a rabid state. In evidence of the truth of this persuasion, Mr. Youatt, the celebrated Veterinary Surgeon, adds his own, and informs us, "that by fighting dogs, in a tenfold greater degree than by any other breed, *sabias canina* is propagated.—See also the following extract from *Samuel Cooper's Dictionary of Practical Surgery.*

Page 604, second column, says:—"the term hydrophobia is a palpable misnomer, for in no instance does there ever exist any dread of water" (in dogs). "On the contrary, dogs are in general very greedy after it". Same column. "There is very little of that wild savage fury that is expected by the generality of persons". Same column. "An early antipathy to strange

dogs and cats is observed." Page 605. "These animals, when actually affected with rabias, from their quiet manner, have even not been suspected of having the disorder, and have even been allowed to run about, fondled and slept with." (*See Mem. of Swedish Acad.* 1777.) "Boerhaave, however, suspects that it sometimes arises from infection." Same page.

"We learn from Dr. J. Hunter, that in the hot island of Jamaica, where the dogs are exceedingly numerous, not one was known to go mad during forty years." Page 605, line 3, second column. "Although (says M. Larrey), hydrophobia is more frequent in warm than temperate climates, it is not observed in Egypt; and the natives assured us that they know of no instance in which the disorder had manifested itself either in man or animals."—"No doubt," it is remarked, "this is owing to the species anc dharacter of the dogs of this country and their manner of living."

It is remarked, that "the Egyptian dogs are almost constantly is a state of inaction: during the day they lie down in the shade, near vessels full of fresh water, prepared by the natives. They only run about in the night time." Then, in speaking of the Egyptian dogs (same page), it observes, that "their disposition is meek and peacable, and they rarely fight with each other: possibly all these causes may exempt them from rabias."—*Larrey in Mem. de Chis. Miletaire, tom. ii. p.* 226.

"In Mr. Meynell's account, which was communicated to him by a physician, it is asserted that the complaint never arises from hot weather, nor putrid provisions, nor from any cause except the bite; for, however dogs have been confined, however fed, or whatever may have been the heat of the season, the disorder never commenced without a possibility of tracing it to the preceding cause; nor was it ever introduced into the kennel, except by the bite of a mad dog. This malady is also stated to be rare in the northern parts of Turkey, more rare in the southern provinces of that empire, and totally unknown under the burning sky of Egypt. At Aleppo, where these animals perish in great numbers for want of food and water, and the heat of the climate, this disorder is never known. In other parts of Africa, and in the hottest zone of America, dogs are said never to be attacked with madness."—Page 609, line 60, first column. "A species of hydrophobia has been known to originate from an inflammation of the stomach (*Med. Essays, vol.* 1.); also from the bite of an epileptic patient, or of persons in violent fits of passion."

The dangers of hydrophobia then appearing to be increased by dog-fighting, the abolition of dog-fighting and the pits where it is practised, must tend to prevent hydrophobia.

LEWIS GOMPERTZ.

CHECK-PULLEY TO PREVENT THE RETURN OF MOTION.

By Mr. R. Christie.

In a lecture on friction recently delivered at the London Mechanics' Institution, Mr. Christie introduced a pulley with an appendage, by which the return of motion is prevented, so that a weight raised by it will not descend by liberating the rope with which it was raised, and thus the hands may be shifted with greater facility than with pulleys of the usual construction, while no danger can arise from the rope being accidentally let go. This is effected by pressing through the medium of a short lever jointed into the block or pulley frame, and resting in a sloping direction on the cord as it is drawn over the pulley; and when the cord begins to return, the lever is brought by the friction of the cord into a position approaching the perpendicular, and thus producing a pressure which increases with the increase of weight, and prevents the accidental return of motion in a manner similar to that adopted to prevent the return of motion in cranes and other machines by the application of the rack and click.

This apparatus is represented on Plate XVII., at fig. 1, where *a* shows the pulley, *b* the hook by which it is suspended; *c d e* the lever which rests upon the cord *g h*, and prevents the descent of the weight *f*. The small string *i* is used to release the cord when the weight is intended to be lowered. The shoe or piece represented at *e* is hollowed out and jointed to the lever, so that it may embrace a greater portion of the rope. When the pulley is suspended and used in a vertical position, the weight of the piece *e*, which is made of metal, will be sufficient to keep it in contact with the rope, but when used in any other position it will be necessary to apply a slight spring for that purpose.

ESTABLISHMENT OF AN ENGINEER'S HALL PROPOSED.

TO THE EDITOR.

Sir,—Now that the legislature has nearly disposed of the principal public questions and private bills, I beg leave to suggest that a reform of the patent laws ought to be petitioned for by that numerous and valuable body of men who are directly interested in inventions, patents, &c. &c.

Much has been said and written on this subject; but, so far as has come to my knowledge, the very essence of it has been left untouched. My reason for thinking so I shall state with brevity. I protest against inventors being classed with monopolists, and also against the language of grace and favour contained in that badge of oppression called a patent. I will not occupy your valuable space with the history of how absurdly inventors came to

be so classed, and were doomed, after being plundered, to be dismissed, insulted with the language of protection. I proceed at once to assume, what I flatter myself requires no argument to prove, that the humblest individual in the nation has at least as good a right to the produce of his head and hands, as the proudest lord or most wealthy commoner can pretend to have to the products of their estates; and if so, the artist or inventor is no more chargeable as a monopolist for appropriating to his own benefit the produce of his ingenuity or industry, than the landed proprietor who claims the produce of the surface of his estates, or of the mines found beneath that surface. I, therefore, repel with indignation the title of monopolist; and conceive I have a right to demand from the legislature of my country the same justice they have done to authors, and which they have confirmed and extended by a late enactment; and, in order to secure their right, authors are not subjected to the expense or delay of a patent. A book, whether wise or foolish, is entered at Stationers' Hall, and thenceforward its copyright is the property of the author. Why not recognise the right of an inventor, with equal facility and cheapness, by establishing an Engineers' Hall?

It might be objected, that by such means innumerable, frivolous, and worthless inventions might be intruded on the public; but this objection would be still stronger against authors than inventors, for the morals of the public might be endangered by the dissemination of writings of a certain description; and an inventor, however fallacious his projects, could only injure himself by the production of an invention which would, if worthless, be neglected by the public. Being more accustomed to wield the callipers or the compass than the pen, I feel that I am not able to treat this important subject as it deserves; but if through your favour I am able to place it before the public, I trust that some of your more talented readers will have the goodness to elucidate what has been only hinted at by, Sir,

Your obedient humble Servant,

J. C.

While we most cordially assent to the principle of the proposition made by our valuable correspondent, and admire the *idea* of the establishment of an Engineers' Hall for the purposes mentioned, we are not desirous to see the property of inventors "protected" in *all* respects after the manner of authors, who are despoiled of eleven copies of their works for the use of the universities, which are too rich to need them as plunder; and we feel assured that J. C. would not submit to a demand of eleven of his patent steam engines as the consideration for guaranteeing his right.—Ed.

LIST OF NEW PATENTS SEALED.

SALT.—To J. Braithwaite and J. Ericsson, of the New Road, Middlesex, for an improved method of manufacturing salt.—Dated 27th February, 1830. Specification to be enrolled in two months.

COCKS.—To Enoch W. Rudder and R. Martineau, of Birmingham, Warwick, for certain improvements in cocks for draining off liquids.—27th February, 1830. Six months.

FIRE-ARMS.—To C. R. Baron de Berenger, of St. Pancras, Middlesex, for improvements in fire-arms, &c.—27th February, 1830. Six months.

WHEELED CARRIAGES.—To W. Grisenthwaite, of Nottingham, Esq., for an improved method of facilitating the draught or propulsion, or both, of wheeled carriages.—27th February, 1830. Six months.

WOOLLEN CLOTH.—To H. Hirst, of Leeds, York, for certain improvements in manufacturing woollen cloth.—27th February, 1830. Six months.

SPRINGS.—To M. Poole, of Lincoln's Inn, for a certain combination of, or improvement in, springs applicable to carriages and other purposes. Communicated by a foreigner.—27th February, 1830. Two months.

ROVINGS OF COTTON, FLAX, WOOL, &c.—To J. Chesseborough Dyer, of Manchester, Lancaster, for certain improvements on, and additions to, machines or machinery to be used and applied for conducting to, and winding upon, spools, bobbins, or barcels, rovings of cotton, flax, wool, &c. Communicated by a foreigner.—27th February, 1830. Six months.

STEAM ENGINES.—To W. Grisenthwaite, of Nottingham, for certain improvements in steam engines.—27th February, 1830. Six months.

RUDDERS.—To R. W. Sievier, of Southampton Row, Russell Square, St. George's, Bloomsbury, Middlesex, for certain improvements in the construction of rudders in navigating vessels.—27th February, 1830. Six months.

PIANO FORTES.—To S. Thompson, of Great Yarmouth, Norfolk, for certain improvements in piano-fortes.—27th February, 1830. Six months.

WHEELS FOR CARRIAGES.—To W. Howard, of Rotherhithe, Surrey, for certain improvements in the construction of wheels for carriages.—27th February, 1830. Six months.

MASTS.—To P. C. de la Garde, Exeter, for certain improvements in apparatus for fidding and unfidding masts, and in masting and rigging of vessels.—27th February, 1830. Six months.

WINDOW SASHES.—To T. Prosser, Worcester, for certain improvements in the construction of window sashes, &c.—6th March, 1830. Six months.

SUGAR.—To T. R. Guppy, Bristol, for a new apparatus for granulating sugar.—6th March, 1830. Six months.

QUARRIES, BRICKS, TILES, &c.—To R. Stevenson, of Colridge, for improvements in machinery for making from clay, or other suitable materials, quarries, bricks, tiles, &c.—6th March, 1830. Six months.

CANVASS AND SAIL CLOTH.—To J. Ramsay and A. Ramsay, of Greenoch, North Britain, and M. Orr, of Greenoch, aforesaid, for an improvement in the manufacture of canvass and sail cloth for the making of sails. —20th March, 1830. Six months.

WINDLASSES.—To G. Scott, of Water Lane, London, for certain improvements to windlasses, &c.—20th March, 1830. Six months.

PEPPER.—To J. A. Fulton, of Lawrance Pountney Lane, Cannon Street, London, for an improvement in the preparation of pepper.—20th March, 1830. Six months.

COOKING APPARATUS.—To W. E. Cochrane, of Regent Street, Middlesex, for an improvement or improvements on his patent cooking apparatus.—20th March, 1830 Six months.

IMPROVED GUARDS OR PROTECTORS.—To B. Rotch, of Furnival's Inn, Middlesex, for improved guards or protections for horses legs and feet under certain circumstances.—20th March, 1830. Twelve months.

DESCRIPTIVE ACCOUNT OF ALL THE

PATENTS ENROLLED BETWEEN 20TH MARCH AND 20TH APRIL, 1830.

Particularizing the Offices in which the Specifications may be inspected, with the Dates of Enrolment.

PUMPS.—To George Vaughan, of Cleveland Street, Mile End Old Town, Middlesex, a patent "for a machine or pump for raising water or other fluids," was granted on the 23d of January, 1830, and the specification was deposited in the Roll's Chapel Office on the 20th of March, 1830.

This is a double-acting pump acting in a horizontal direction; the principle of its operation may be readily understood by comparing it to a high-pressure steam engine, with such difference only as to adapt it better to the pumping of water. The working chamber is either cylindrical or square, but each end of it is considerably enlarged downward, where the valves that receive the water from the rising main are situated. The piston is solid, and packed like those for steam: the piston rod passes through a stuffing-box at one end of the chamber, and is attached at the farthest extremity to a cross head, to which is connected two spear rods. One of these rods passes on each side of the pump, and beyond the opposite end of it to a crank, which is made to revolve in plummer blocks (fixed to a suitable frame), and is turned either with a winch by manual labour, or by any other suitable power. The motion thus described, is, of course, nothing but the ordinary parallel motion. In order that the piston may not by its weight wear most on its under side, the piston rod is continued on both sides of it, and beyond the range of the piston the rod is supported by an anti-friction wheel, thence the rod enters a tubular case, closed at the furthest extremity to prevent the escape of the water, as it is not packed. The action of the pump is this: suppose, by the revolution of the crank, the piston to be moving to the right hand, a vacuum is produced on the opposite side of the piston, which causes the valve from the rising main to be opened by the pressure of the atmosphere, and the chamber is thereby filled with water. On reversing the stroke of the piston, or towards the left, the right-hand valve is opened from the rising main, and that end of the chamber filled with water, while the water which previously occupied the left end of the chamber is forced out by the piston through another valve on the upper side: the succeeding stroke in like manner discharges the water in the

right chamber, and fills that of the left, and thus the action is continuous. In the drawing attached to the specification a large semi-cylindrical wheel is shewn as fixed to the upper side of the pump for the reception of the water delivered through the upper valves, and in the crown of the arch is a pipe for conducting the water if required to a greater elevation. It would obviously have been better had the patentee made the upper part of this vessel into an air chamber, by causing the ascending pipe last mentioned to dip nearly to the bottom of it.

Cocks.—To George Stocker and Alexander Stocker, both of the parish of Yeovil, Somersetshire, gunsmiths, a patent for "a cock for drawing liquors from casks, which produces a stop superior to that which is effected by common cocks, and will continue in use for a longer period of time," was granted on the 26th of January last, and the specification was deposited in the Enrolment Office on the 26th of March, 1830.

The improvement on liquor cocks contemplated by these patentees consists of the introduction of a conical plug made of wood (the preference being given to yew), or some other suitable material somewhat softer than the metal of which the cock is composed. Between the cask and the opening where the liquor is discharged the passage is turned upwards, and widened into a conical form to receive the wooden plug by which the passage is stopped. The stem of the plug, which is made to pass through a collar of leathers to prevent the escape of the liquor upwards when the passage is opened, is squared at the top to receive a key by which it is turned; and it is furnished with two projecting leaves, which take into spiral grooves in the interior of a cylindrical casing, and thus by trimming the stem the plug is screwed down to stop the flowing of the liquor, or raised to permit a free passage through the cock.

The different parts of this invention will be better understood by inspecting the sectional sketch, Plate XIX., fig. 10, where *a* represents the liquor passage from the vessel; *b* a conical aperture stopped by a conical plug *c*; *d* the discharging passage from the cock. On the stem of the plug *c* are two leaves *e e*, which turn in a spiral groove cut in the barrel *f f*, and thereby raise the plug out of, or press it into, its seat. At *g* are several washers to prevent any escape of liquor upwards. The cock is turned by a key fitting in the upper part of the stem *h*.

This invention is not without merit in the arrangement of the

different parts, but we fear that its complication and consequent expense will prove a bar to its general introduction.

SPRING LATCH.—To John Arnold, of Sheffield, Yorkshire, powder-flask maker, a patent for "an improved spring latch or fastening for doors," was granted on the 26th of January, and the specification was lodged in the Enrolment Office on the 26th of March, 1830.

A very few words will be sufficient to describe this invention, which is represented by fig. 6, Plate XX., and which consists of a hollow cylindrical bolt *a*, with a solid projecting part at *e*, beveled off at the ends in the usual way for the facility of shutting the door to which it may be applied. This fits into, and moves in a case *b b*, let into the style of the door. The bolt is projected forward by the helical spring *d*, and it is drawn back by the handle nobs *c c*, or these nobs may be placed a little above or below the bolt, and act upon by a small projecting lever firmly fixed into their axis at one end, and at the other acting upon a pin in the bolt. In this case the bolt is withdrawn by turning the handle, while in the first it is withdrawn by pulling the handle back in a slit provided for that purpose. *e* is a groove through which a pin passes to prevent the bolt from being turned round, or being projected too far out by the action of the spring.

CAT-HEAD STOPPERS.—To William Rodger, of Norfolk Street, Strand, London, lieutenant in the Royal Navy, a patent for "certain improvements in the construction of cat-head stoppers," was granted on the 30th of September, 1829, and the specification was deposited in the Enrolment Office on the 30th of March, 1830.

The usual process of catting the anchors, which consists in hooking tackle suspended from two beams, called cat-heads, projecting from the stern of the vessel, to the rings of the anchors. After it has been brought close up under the stern, that it may be brought out and elevated so as to be taken on board the vessel, or suspended from the cat-heads, ready to be let go when required. Now, this process occupies considerable time, and is attended with much inconvenience and some danger to the men engaged in it.

To remedy these inconveniences, Lieut. Rodger has invented an apparatus denominated by him *cat-head stoppers*, which may be considered almost as self-acting as far as regards the liberation

of the anchors from the cat-heads, which is a far more dangerous operation than that of hooking them to the cat-heads.

The apparatus, which is represented by fig. 9, Plate XIX., consists in a double hook *a a*, forming a kind of forceps turning on a joint *d*, and suspended from the cat-head by the double chain *b b b*, when the anchor is attached to it as shown by the figure. The tendency which the lower branches of the chain *b b* have to collapse by the suspension of a weight to them prevents the forceps from opening to let go their hold of the anchor ring *e*, and produces an increased security with an increase of weight; but when it is intended to let the anchor go, the chain *b b b* is let out till the chain *c c*, which has one end attached to the projecting beam, and the other to the joint of the forceps, by the bridle or shackle shown at lower *c*, when the forceps are no longer kept together by the double chain acting upon the upper arms they open, and the anchor is liberated without loss of time, inconvenience to the seamen, or risk of life.

COPPER SHEATHING.—To John Gray, of Beaumorris, Anglesea, Gentleman, a patent for " an improved method of preparing and putting on copper sheathing for shipping," was granted on the 4th of February, and the specification was deposited in the Enrolment Office on the 3d of April, 1830.

The sheets of copper are fastened to the bottoms and sides of ships by a row of nails along the centre of the sheet, and another along each side. Now, to contrive apparatus, by which the nail-holes can be readily pierced of uniform dimensions and at equal distances, has been the object of Mr. Gray.

This apparatus is shown at figs. 11 and 12, Plate XIX. *a a*, fig. 11, is a strong iron frame firmly bolted to the bench *b*; *c* is a steel plate screwed to the bench, and having a conical hole to correspond with the conical end of the punch *e*, and the heads of the nails by which the sheathing is to be fastened to the vessel. *f* is the punch and lever handle by which it is to be turned or screwed down upon the sheet of copper which is passed along over the steel plate. To regulate the distances between the holes, the steel plate has a row of holes extending across it at the required distance from each other: now, into these holes the conical projections produced on the under side of the copper by punching exactly fit, as they are made precisely similar to the hole under the end of the punch, and thus the distance between the holes is regulated to the greatest nicety. The other form of

the apparatus represented at fig. 12, is intended to punch holes along the edges of the copper after the sheet has been attached by a few nails along the middle. As the edges of two sheets are fastened by the same nails, it is of the utmost importance that the distances between the holes should be equal; and as it is equally important that the exterior of the sheathing should be smooth, and consequently that the form of the holes should be uniform, and in accordance with the form of the heads of the nails. To effect these two desirable purposes, Mr. Gray proposes to use this instrument, which he carries in the left hand by the handle *a* along the edge of the copper to be pierced, and works it with the right hand by the lever acting upon the screwed stem *f* of the punch *e*, which forces it into the steel plate *c*, precisely as in the last instrument.

The lever *g* has at one extremity a small rod at the same distance from the punch that the holes are apart, and that determines the distances by being pressed through the medium of a spring acting on the other end of the lever into the last hole pierced, while the punch is brought down to pierce another, and so on in succession.

This instrument we consider to be a very ingenious portable punching machine, and we have no doubt it will be found very serviceable for many purposes not at first contemplated by the patentee.

GLOBES.—To George Pocock, of Bristol, Gentleman, a patent for "improvements in making or constructing globes for astronomical, geographical, and other purposes," was granted on the 4th of February, and the specification was lodged in the Enrolment Office on the 3d of April, 1830.

The principal intention of this patentee seems to be the construction of globes of a more portable kind, and therefore better adapted for many purposes than those of the usual construction. He makes them of thin tough paper manufactured from new linen rags, or of silk or other fibrous substances, which can be made air-tight, or nearly so. These are printed in gores in the usual way of printing the covers of globes, and then pasted or cemented together in the same manner that the gores of a balloon are connected together. A circular opening of about seven inches is left at the south pole through which it is to be inflated, which is effected in a very simple manner by lifting it about fifteen or twenty inches from the ground, and then letting it drop with the

opening downwards, by which a portion of the air between the globe and the ground is received within it, and this operation is repeated till the inflation is completed, when the globe is ready for use; and by resting the opening on a table, or on the carpet, the globe will remain distended for a considerable time. Another mode of filling it is represented by fig. 5, Plate XX., where *a* represents a portion of the globe; *b* a pedestal on which it rests; *c c* openings for the admission of air into the pedestal; *d d* is a kind of piston fitting loosely into the pedestal, moveable on the guide rod in the centre, and furnished with two valves opening upwards. This piston is raised by the cord represented proceeding from the centre of the pedestal, and over the pulley at *f*, and forces air through the valves at *g* into the globe.

To adapt the globe for the solution of problems, Mr. Pocock employs an hour circle of cloth or paper, which he attaches to the North Pole, and a flexible divided scale, which serves for a meridian as well as a quadrant of altitude. On this scale the numbers are so arranged as to shew at once the number of miles between any two places to which the scale may be applied. The apparatus is also furnished with the days of the month and the corresponding degrees which the sun occupies in the zoic in a tabular form.

A very ingenious method of rendering this globe transparent, and at the same time making it rotate on its axis, is described in the specification. It consists in the introduction of a series of ribs, of wire, or some light flexible material, each forming a perfect semicircle to keep the globe distended without forcing air into it for that purpose. The globe is made to rest upon an axis attached to the pedestal, which axis is bent from the straight line at one part, that a lamp may be suspended from it near the centre of the globe.

At the north pole an opening is made for the escape of hot air and smoke from the lamp, and into this opening is fitted a set of oblique vanes, which the current of air, produced by the heat of the lamp, acts upon, and thus produces rotation in the globe, which is of course kept up as long as the lamp continues to burn within it. This effect is extremely beautiful, and obtained, as will be perceived, by very simple means. Gloves of this description can of course be folded up, when not in use, and one of four feet diameter may be packed so close as to admit of its being carried in the crown of an ordinary hat. This is really a novel and highly interesting invention, though much accuracy must not

be expected in the solution of problems by the apparatus; but, for geographical reference and illustration, it is well adapted. Several of these globes, on a large scale, in lithographic printing, are exhibited at the National Repository, Charing Cross.

NATIONAL REPOSITORY,

FOR THE EXHIBITION OF IMPROVED WORKS OF ART,

CHARING CROSS, LONDON.

In conformity with the announcement contained in our last number, we proceed to give a general account of the subjects which form the present exhibition.

Although it is our more immediate business, and generally our pleasure as well, first to notice the apparatus and machinery, we must be excused, in the present instance, for directing the reader's attention to that which is uppermost in our mind, and which does not fail to excite in every beholder of feeling or taste the deepest admiration, we allude to a most splendid composition in bas-relief for a frieze, which represents

The Triumph of Alexander.

The original of this frieze was composed by the Chevalier Thorwaldson for the Quirinal Palace at Rome, in the expectation of Napoleon's visit to that city; it was in plaster of a size double that of the prize here exhibited. By it the young sculptor's reputation was at once established. Count Sommariva many years afterwards requested the Chevalier Thorwaldson to execute it in marble for the Count's well-known villa on the Lake of Como. Lately, the artist, desirous of reviving the old Roman art of multiplying sculptured compositions in burnt clay (fragments of which are every day found in Rome where he resides), reduced the original to half the size, and superintended its formation in the present material by his eminent pupil Signor Bienaimé. The story is told by the figures themselves. The scene is without the city. First, we see a camel unladen by a river side—a fisherman—ferrymen carrying over the merchant with his goods, and the god Euphrates himself resting on his urn; then below the walls of Babylon a flock of sheep led forth for sacrifice; Magi with a celestial globe; then the presents, a lion, a horse, and a leopard, in one group, and further several horses; next, the musicians; then the priest and his attendants setting up a portable metallic altar. We now find dancing women, warriors, and, lastly, the family of Darius paying homage to the conqueror, whom the Goddess of Peace welcomes as he approaches in his chariot. Alexander is followed by his victorious soldiers, foremost among whom is his famous horse Bucephalus; while the train is mournfully closed by the dethroned Persian monarch, his hands bound behind him,

walking by his elephant, which is laden with trophies. The last figure in a toga, beneath a palm-tree, worked in very low relief, is the likeness of the illustrious artist himself.

The figures are for the most part extremely beautiful, and from their great number the frieze extends nearly half the length of the gallery; and were there nothing else in the exhibition than this single work, every artist who visits it would consider that he had not misemployed the time devoted to its examination. The frieze was sent in by Philip Pusey, Esq., of Upper Brook Street, and to his liberality the National Repository stands indebted for several other specimens of sculpture of great excellence.

Patent Perspective Tracing Instrument. By F. RONALDS, ESQ., *of Croydon.*

THE exhibition of last year contained Mr. Ronalds's beautiful instrument for drawing in perspective from real objects, one of which is still (from its great merit we suppose) retained in the gallery. This instrument will be found described in Vol. II., new series, p. 204. The inventor has this year sent in another drawing machine, which, if it does not excel, at least rivals the other in ingenuity and practical utility. By this architectural, mechanical, and other subjects may be accurately *drawn in perspective*, by merely tracing over their ground plans and elevations. The artist and draughtsman may therefore by availing themselves of its use save themselves a great deal of labour and time in obtaining correct delineations in perspective at any desired point of view and distance. By the usual process of drawing in perspective, to the labour of the operation is added the time lost in making changes in the position or distance, in order to obtain a more agreeable or advantageous view. By Mr. Ronalds's instrument these changes are obviously effected with scarcely any trouble, as it merely consists in shifting the position of the plan on the table, and tracing a few of the outlines from it. In subsequently forming the picture, all the true perspective points and lines are instantly found and drawn by simply tracing them on the plan, in perhaps one-tenth part of the time required by the common method of proceeding.

In Plate XX., fig. 4, we have given a perspective sketch of one of these instruments of a smaller size than that exhibited in the Repository, the construction of which is clearly explained by the following directions given by the patentee for its use with reference to the drawing.

DIRECTIONS.

1. Fix the sheet containing the ground plan upon the base of the instrument *a*, and the paper intended to receive the drawing upon the perpendicular drawing-board *b*.

2. To mark the true perspective place on *b* of any given point upon the ground plan *a*, apply the point of the *rod c* to that point, whilst the *slider d* rests with its universal joint at its *lowest* position

on the rod; then allow the pencil *e* to touch the paper, by raising the little lever *f*.

3. If the given point be situated *above* the ground plan, bring the point *c* to its projection (or perpendicular place) on the ground plan, raise the *stop g* to the required height (measuring from the top of *d*), raise *d* to *g*, and allow the pencil to touch the paper as before.

4. Any number of points belonging to a geometrical or other figure, whatever be their situations (provided that their projections on a ground plan and their heights above it be known), may be thus fixed upon the drawing-board with great rapidity and facility, and they may be united from time to time until a perfect perspective representation shall have been completed; or points thus found may be advantageously applied as guides for vanishing lines, &c. &c. &c. —But,

5. All kinds of lines situated either upon or above, and *parallel* to the ground plan, may be put immediately into perspective with perfect accuracy, by tracing the point *c* over them, or their projections on *a*, whilst the pencil *e* touches the paper; and all perpendicular lines, by moving the slider *d* up or down the rod between the *stops g* and *h*.

6. To determine *the point of distance*, draw out the tube *i* to a proper length; and to fix the height of the *horizon*, adjust *k* to a proper height. *l* and *m* are *clamping screws*.

7. When the instrument is required to be packed up, unscrew the rod *n* from the *fork* at *d*, and withdraw it from the two *universal joints o* and *p*. Take the arms *r* and *s*, and all that belongs to them, off from the rollers on which they run, and unscrew them from the piece *t*. Then take out the pins *v*, so that the drawing-board *b*, and frame *w*, may be turned down and lie flat upon *a*. Unscrew the rod *c* from its base, withdraw *k* from its socket on *i*, slide *i* into *a*; then pack every thing into the space which will be left upon the base *a*, except the tube *n*, which packs in a separate case.

These machines are made of such dimensions as to serve for drawings of the largest size, and are also provided, if required, with various motions for *ruling right lines, and describing mathematically, and with very little trouble of adjustment, circles* and *ellipses*, about their perspective centres. The larger sizes are usually mounted on a table, to which is fitted a kind of *treadle*, &c., in order that the *foot* may perform the office of withdrawing the paper from the pencil, and return it instantaneously, thus leaving both hands free to work the drawing.

The price varies from ten guineas upward; it increases much less in proportion to the *size* than to the quantity of apparatus adapted to it.

N. B. Further details are given in a descriptive pamphlet published by the patentee.

Apparatus for racking Wines bright from the Lees. By Mr. Hilton, *of Regent Street.*

The operation of racking wines by the usual method is one of considerable trouble, and is often productive of injury to its quality, by exposure to the atmosphere, as well as a waste of its quantity. To obviate these disadvantages, Mr. Hilton (who is a wine merchant) has contrived a very simple and convenient apparatus by which the process may be performed with the greatest ease, and without the chance of deterioration or waste. This apparatus, as manufactured by Mr. Russell, of St. John Street, West Smithfield, is represented in Plate XX. by fig. 2; the following is an explanation of its construction:—

a is a cask of wine to be racked off; *b* an empty cask into which the wine in *a* is to be transferred; *c* is an exhausting pump fixed by a conical screw at the bottom into the bung-hole of the cask *b*; *d* and *e* are two cocks screwed into the casks near to the chimes, and communicating with each other by a syphon *f*, and a flexible tube or hose *g*. At *h* there is a valve to prevent a return of wine from the cask *b* to *a*. At *i* there is a cock to try the brightness of the wine, and at *k* an air-cock. The lower portion of the syphon is made of glass, that the wine may be seen during the operation.

The pump *c* being put in action, a vacuum is caused in the cask *b*, and the bung in cask *a* being taken out, the pressure of the atmosphere upon the surface of the wine causes the wine to be discharged, and rise in the cask *b*, until it gets as low in the cask *a* as *m*. The cock *d* being then half closed, and the cask *a* tilted, all the wine will flow out of it, the syphon preventing the air from passing during the latter part of the racking. It takes about five minutes time to rack a hogshead carefully. The distance between the casks is immaterial, which adds much to the convenience of the apparatus.

Patent Apparatus for evaporating Syrup and other Solutions. By William Godfrey Kneller, *of Pear Street, Spitalfields.*

The novelty of the process, for which this mechanical arrangement has been designed, consists in forcing air, by means of bellows or other blowing apparatus *through* liquids subjected to evaporation, with the view of expediting the operation, and accomplishing it at a low temperature. The patentee states, that, in evaporating cane juice or syrup for making refined sugar, he can bring it to the proper crystallizing point by keeping the temperature between 140° and 170° Fahrenheit: that he obtains by it a great quantity of large and shining crystals, which were hitherto attainable only by evaporating *in vacuo* only, a troublesome and expensive process, while other methods, by exposing the sugar to a high temperature, impair the quantity, size, and brilliancy of the crystals, and form a great quantity of molasses or treacle.

At Plate XIX., fig. 5, a perspective sketch of this apparatus is given as applied to vessels of small capacity; the arrangement is,

however, quite as simple, and only more extended when applied to larger vessels. *a a* is a pan or boiler about half filled with liquid; *b b* an air tube running horizontally above the surface of the liquid, and supported at each end by legs which rest on the bottom of the vessel. The air is forced in at *c*, and filling the tube *b b*, escapes at the lower orifices of the small pipes *d d*, which do not quite touch the bottom; thence it rises through the liquid, producing great agitation, and rapidly abstracting the heat together with aqueous matter in the form of steam. By raising the degree of heat under the pan or boiler, and increasing the quantity and velocity of the air injected into the solution; or, on the contrary, by lowering the heat, and moderating the injection of air, the evaporation is accelerated or retarded at the pleasure of the operator, according to the nature of the substances, or the effect desired.

The pans used for evaporating on this plan should have flat bottoms, and the depth of the fluid should be equal in all parts. When sufficiently concentrated the liquid will not readily flow out of the aperture opened for the purpose: to remedy this inconvenience, a flat vertical plate 4½ to 5 inches in height, and of a length rather less than the breadth of the pan, such plate being kept in its upright position by projections at right angles with its lower edge, which must slide as nearly as possible in contact with the bottom of the pan. When the evaporation is sufficiently effected, the system of pipes are raised by a winch about six inches high, when the upright sliding plate is drawn towards the discharging aperture, and thereby cleanses the bottom of the plan. To admit of the pipes being raised, without cutting off the communication with the blowing apparatus, they are connected by a flexible tube.

Check-Register for marking the Quantities of Liquors drawn from Casks. Invented and manufactured by Messrs. Arnold *and* Armitage, *of Moor Lane, Cripplegate.*

This apparatus, which is delineated in perspective by fig. 6, Plate XIX., is called by the inventors *The Patent Liquor Machine.* We expected to have been favoured with some account of the internal construction of the machine before this number went to press; but not having yet received it, we can only state at present that it has an elegant appearance, is about the size of a large table-clock, and has a dial face, on which is engraved five graduated circles, with indexes registering the quantities in eighths of pints to one hundred gallons, thus affording an effective check against any unauthorized abstraction of fluids which it is necessary to keep under guard.

Improved Four-Wheeled Carriage. By F. Ronalds, *Esq., of Croydon.*

To construct a carriage that shall be less liable to overturn than the common sort, and that shall uniformly adapt itself to the

most rugged and uneven surfaces, every body must admit to be an object of the greatest interest and value. A simple method of effecting this object occurred to Mr. Ronalds about two years ago, when he constructed a little model of the carriage; this model is now deposited in the National Repository, from which we have made the sketch, fig. 3, plate 20. The banks, and other ordinary obstacles over which the carriage is represented as running, are not so great in proportion as those which we caused the model to surmount on the table of the Repository. The ability of the carriage to run through ditches, and over banks and mile-stones, cannot be doubted, however unpleasant and unadvisable it may be to take rides of that kind. Yet the reader will allow, that, were he to attempt to run over a *mile*-stone in a common carriage, he would most likely have a *grave*-stone placed over him shortly afterwards.

a represents the perch of the carriage, to which is *fixed*, at right angles, the axletree of the hind-wheels, *b b; c c* are the fore-wheels, the axletree of which is divided in the middle, where the extremities are made semicircular, so that when united (by bolting), they form a ring, constituting a portion of an universal joint, *d;* this joint allows of the axletrees of both the fore and hind-wheels to assume any angle with the ground, or rather horizon, without materially disturbing the vertical position of the carriage body that might be suspended above.

Apparatus for boring the Earth for Water, or Minerals. By L. Hebert.

The object of this invention is to reduce the labour and shorten the process of boring the earth, as practised by the ordinary instruments, in which every portion of the rod constituting the entire length inserted into the aperture is necessarily *taken to pieces* every time that a charge of earth is drawn up to the surface, and *put together again*, in order to let it down for the renewal of the boring or changing the tools.

The *time* thus occupied in connecting and disconnecting the numerous pieces (sometimes amounting to a hundred) is calculated at full nine-tenths of the total period of time employed in completing the perforation, and the labour attending it bears the same proportion. To obviate the expenditure of so much time and labour, the present invention has been proposed, and the inventor is sanguine in his expectation that so important a desideratum in the useful art of boring the earth may thereby be fully attained.

It is several years since the inventor proposed an apparatus on the *principle* of the model exhibited, (which he described in the first volume of the Register); but in some of the details of construction modifications have been introduced which make it require, perhaps, a second notice; and it should be observed that the present *model* was the earliest mode, and does not combine some improvements introduced into an apparatus of the full size subsequently made.

This model consists of an auger, with a spiral worm winding round a cylinder, the centre of which cylinder is perforated longitudinally throughout, with a square hole, for the purpose of receiving within it a square bar, upon which the auger will easily slide up and down. To the lower extremity of the bar a stout chissel-formed steel tool, technically called a "*jumper*," is *welded* to it: this single tool is used in passing through all kinds of strata; it is *universally* used in perforating hard rock, and it of course easily penetrates soft substances, the auger in every case receiving the materials cut through, which, when completely charged, is drawn up, sliding upon the square bar to the surface, where it is discharged of its contents, and let down again.

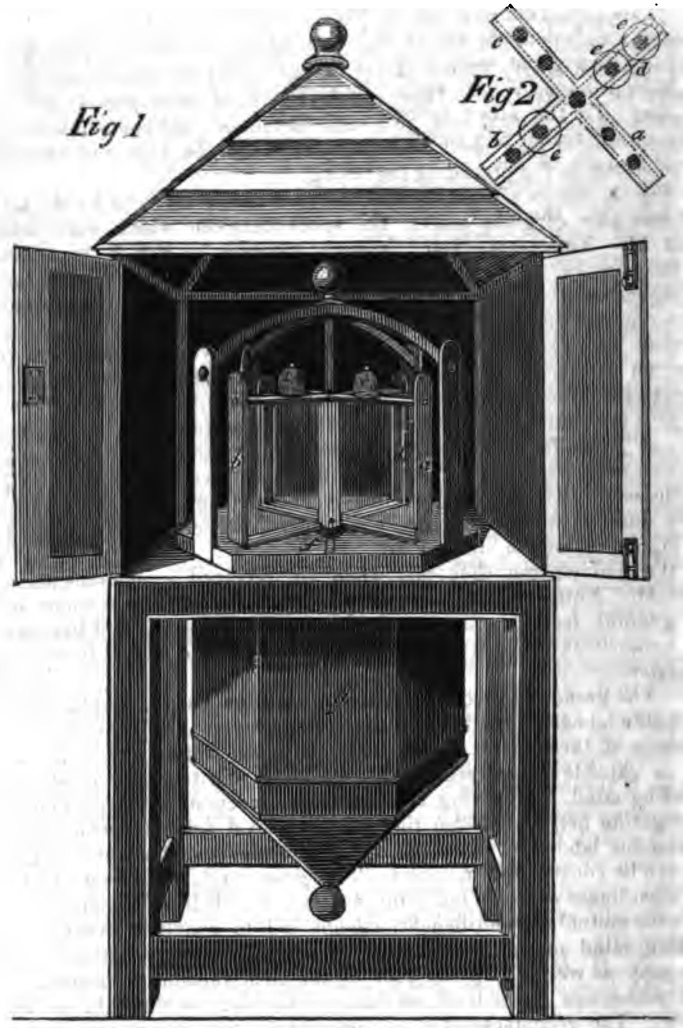
The mechanical means by which the auger is raised and lowered are of various kinds, all very simple, but experience must determine which is the most convenient: the "monkey" employed in pile-driving has been tried by the inventor, and found to answer very well.

The rod is lengthened as the perforation deepens, by a peculiarly constructed solid steel joint, which renders the rod stronger at the junction than in any other part. The rod is not drawn up until the perforation is completed, unless an accident should render that necessary, which is, however, much less likely to occur with this machine than with those of the usual construction, on account of its superior strength, and its being subjected to less wear during the operation.

To prevent any large masses from sticking at the entrance of the cylindrical case, a strong curved knife-edged piece of steel is fixed near to it, by which nothing can pass that will not easily enter the cylinder; this curved piece of steel likewise serves to enlarge a little, and perfect the figure of the hole excavated.

The inventor proposes, where the soil is not very compact, to pipe it throughout, by a process simultaneous with the boring, and requiring but little additional labour; the particulars of which, together with the various details of the apparatus, he will be happy to explain to any respectable person disposed to undertake boring the earth extensively, and at a cheap rate, for the purpose of obtaining a plentiful supply of pure water, which is so much wanting in this great city.

N. B. It is worthy of remark, that an apparatus, on the principle of this boring machine, may be rendered a most effectual PILE-DRIVER, *especially for driving them in oblique positions, and under water. The reader has only to imagine the "jumper" or chissel at the lower extremity to be a* SCREW *fixed into the head of the pile, and the cylinder to be the* RAM *or weight, and he will perceive, that while the instrument will hold the pile in the required position, the ram will inevitably be guided by the bar, it will produce the utmost effect (of a body falling in the direction given) upon the pile.*



Improved "Observatory" Bee-Hive. Invented and manufactured by Mr. T. Nutt, *of Moulton Chapel, near Spalding, Lincolnshire.*

In the last year's exhibition Mr. Nutt exhibited in the Repository several forms of his improved bee-hives, one of which we described, with an account of the produce and management of it, in our last volume, page 228. Referring our readers to the important facts there given, we proceed to give a brief description of another kind

of hive, in which all the interesting operations of those valuable insects, the bees, may be constantly and minutely examined.

The mechanical arrangements to effect this object are the happiest imaginable. The bees being inclosed between two glass plates, only one inch apart, affords plenty of light, and the utmost transparency, for observation. There are four pair of these plates, which proceed from a central axis, in a radial direction, and communicating with the winter apartment beneath. This will be best understood by reference to the preceding engraving.

Fig. 1, shews a front view of the *observatory* hive; *a b c d*, are the four pair of glass plates, the space between which constitute what Mr. Nutt terms their "summer pavilion." Fig. 2, is a plan of this portion of the hive, and serves to explain more clearly the arrangement of it, *a b c d* being the four divisions, and the dotted lines representing the edges of the glasses set into their wooden framing above; in which framing there are two apertures to each arm, for the bees to pass through to deposit their honey, in glass receptacles, placed over them, as shewn at *e e e e*, in both the figures. At *f*, is the entrance for the bees to the summer pavilion; and below this, at *g*, is the winter hive. The four divisions, *a b c d*, turn upon an axis, so that any portion of the glass hive may be examined at pleasure. The whole apparatus is enclosed in a neat and sufficiently durable wooden framing, the upper part being boxed in, and having doors, at *h h*, to lock up.

We had written thus far, when we received a communication from Mr. Nutt, to which we readily give insertion, on account of the genuine feeling and natural eloquence it displays, and because the writer is an authority of great experience in the matter to which it relates.

"The grand object of this machine is to expose for public view the inside labour of the bees in the cottage hive. The beautiful appearance of these insects is one that excites admiration and surprise, and is capable of enlivening the drooping spirits of the most desponding mind, on viewing the sovereign queen of bees constantly propagating her young—her thousands of loyal subjects, whose indefatigable labour in all its parts is so conspicuous, that not a single cell can be constructed in secret. The great regularity, the neatness and cleanliness of these beautiful insects, also their assiduous exertions for mutual aid and benefit, cannot fail to convince every discerning mind of the great absurdity of their annual destruction. You may as well dig up the root of the most valuable fruit-tree, to gain possession of its fruit, as destroy the hive for the sake of its honey. The receptacles having been ventilated, cause the propagating queen of bees to confine herself to the warm temperature of her pavilion, which causes her loyal subjects to fill the glass receptacles with the crystal drops, flowing in profusion, before the curious observer of their much-admired works. These noble insects' indefatigable labours alone should soften our feelings, and demand from us their lives, in return for their treasures: these they give as pure as the crystal stream, by the influence of ventilation. Why, reader,

would thou lay the axe to the tree that produces good fruit? had thou not better gather the fruit from its pure branches, and let the root live. Watch the influence of the machine before you, and you will discover its true effects; you will behold the tree of life—its branches putting forth the pure sweets, with the pleasing reflection of its possession by a momentary act of humanity; a single touch of the machine will immediately divide their labour, even at the most vigorous time of their gathering season, without danger or trouble to the operator.

"It is a rational idea, and wants only common reflection. He that has been a father, or she that has been a kind mother, knows the desire of their children. Take the lovely offspring from the mother's protection, and imprison the same before her eyes—will she not impatiently cry aloud for its liberty? and will not the child's screams return her affection? and, when liberty is proclaimed, consolation quickly follows, with the lost child once more under its mother's care.

"*The same is demonstrated* by the mother of the hive when turning off the honey from the pavilion. The sovereign queen of bees who loves her offspring, and constantly lives in harmonious concord and affection, cannot endure separation from them—her subjects loving her in return; and when they are divided only for a few minutes, we see in the hive a momentary change of their labour, and sorrow and lamentation is seen and heard amongst them—the mother calling for her lost children,—they, her children, anxious to be released in return; and as soon as an opportunity presents itself, which shortly after takes place, no sooner are they at home, and in a few minutes tranquillity is found, and happiness is restored to the once unhappy mother of the hive, her subjects surround her *throne*, and their recent prison visibly becomes their palace, and a magazine of treasure, which the humane manager is entitled to."

"To works of Nature join the works of Man,
To shew by Art, improv'd, what Nature can.
Nature's great efforts can no further tend;
Here fix'd her pillars, all her labours end."

DRYDEN.

Russian Tea-Urn and Water-Heater.

THIS apparatus was sent into the Repository, we understand, by Mr. Labouchere, as an example of Russian manufacture in this department of Art, and likewise to shew the usual manner of heating water in that country.

At Plate XIX., fig. 7, we have given a perspective sketch of the machine, viewed from underneath. The whole is constructed of fine sheet brass, and is of excellent workmanship: much ingenuity is also displayed in the method of putting the parts together, the most simple and efficient being adopted for that purpose. An instance of the latter is brought into view in the drawing, where the upper ends of the supporting legs *a a a*, passing through sta-

ples *b b*, nicely fitting them, fix at the same time the ash pan *c* to its place, which allows the latter to be withdrawn, by sliding back one of the legs. The fuel intended for this apparatus is charcoal, and is thrown down from above through a central flue *d*, into a cylindrical furnace chamber, *e*, upon a cast-iron grating at the bottom. The form of this furnace, as shewn by the dotted lines, and its arrangements, are similar to those employed by Messrs. Braithwaite and Ericcson, in their locomotive carriage, described in our previous Numbers, which we observed at the time was not new in this country, and was very common on the Continent; (and for saying which, together with other obvious truths, certain weak persons showered upon us a very refreshing quantity of abuse. Air is supplied to the furnace through the perforated ash-pan; and there is, at the upper part, another perforated piece, *f*, open at top and bottom, which is probably intended to place a separate vessel upon, that requires heat; the tube and handle, shewn at *g*, is, we believe, merely intended to lengthen the flue at pleasure, either for carrying off the vapours, or increasing the draught: *h* is a cap of metal, which we did not discover the exact application of. Both the design and the execution are such as to reflect credit upon Russian taste, and the mode of heating is one of great economy and convenience; the quantity of charcoal consumed being but small, and being used in an open room, no material deterioration of the atmosphere can take place.

Spring Support to a Harp. By Messrs. J. *and* J. Erat, *of Berner's Street.*

This is a useful little contrivance, attached to the base of a harp, for supporting it in any position convenient to the player, a sketch of which we have given at fig. 8, Plate XIX. It consists of two convoluted springs, *a a*, (like clock springs), wound upon a common axis, which is fixed upon two upright metallic bearings, *b b*, the latter being attached to a mahogany board, *c*, that forms the stand for the harp. The external extremities of the springs are fastened to a brass bar, *d*, in the middle of which a short chain connects it to the foot of the harp, *e*, the elasticity of the springs supporting the instrument. If the inclination of the harp be too great or too little, its base is shifted a little forward or backward, which makes no difference in the support afforded by the springs.

Both in the workmanship and the ornamental design, the harp to which this pretty invention of Messrs. Erat's is applied, is very beautiful; it is, however, quite out of tune, and, some persons say, never will be restored, as it was made expressly for, and was for some years in use by the unfortunate Marie Antoinette, Queen of France.

Machine for registering Distances travelled. By Mr. Marriott, *of Fleet Street.*

The external appearance of this instrument is represented in fig. 1, Plate XX., and is to be attached to a carriage, so that every revolution of the wheel shall move one tooth of the nearest cog-wheel brought into view at *a*, the dial over which consequently denotes the circumference of the running wheel, which is expressed in yards. The motion of the first cog-wheel gives motion to a series of cog-wheels and pinions, which are successively operated upon in slower time, and register greater spaces by their indexes and dials—the first, *b*, being yards; the second, *c*, furlongs; the third, *d*, miles; the fourth, *e*, 100 miles; and the fifth, *f*, 1000 miles. The instrument is useful, although it is unnecessarily complex, and not so good in principle as some other meters devised for the purpose.

CHAIN BRIDGES.

Mr. Editor,—In Mr. Mactaggart's Travels in Canada, Vol. I. p 315, is the following paragraph:—"A chain bridge to stretch across the St. Lawrence from *Cape Diamond* to *Point Levi*, a distance of more than a mile, where the current is strong and water deep, seems no easy task; yet it might be performed, if sufficient caution, patience, and money were produced for its construction. The chain bridge would require five *floating piers*, and these may be so constructed and so anchored that even the heaviest drift ice, rushing before a flood, would not be able to sweep them away. If, then, a bridge be really desired across the river at Quebec, it is hoped that those, who ought to speak in its favour, will say nothing against it on the score that it *cannot be performed;* for the work can be done, and in such a manner, that the navigation will not be interrupted thereby in the least degree. The expenses attending such an undertaking, considering contingencies, might probably amount to £40,000, nothing less at least could possibly answer."

Upon reading this passage, it struck me, as a resident on the borders of the Forest of Dean, that the plan might be made applicable to the erection of a chain bridge across the Severn, by means of the floating piers, at Newnham, in Gloucestershire. A meeting had been called about four years ago, and the plan relinquished, on account, he stated, of the impracticability of piling, through a vast depth of sand, before reaching rock. I have thought that *floating piers* might therefore be substituted, and have read, concerning Vauxhall Bridge, that the piers are bounded upon submerged boxes; but upon stating this opinion to a judicious friend (not a professional man), his answer has been as follows:—

"Mr. Mactaggart's plan is founded upon the certainty of having a sufficient depth of water to keep his *piers afloat;* but the channel

of the Severn at low water being almost fordable, there would not be sufficient depth of water to float a pier, sustaining a heavy weight; without so completely impeding the water-way, as effectually to stop all navigation at low water and during neap-tides."

The water-way of the river is at full tide about one-fourth of a mile, and if only *five* floating piers were required for the length of a whole mile, *two* might suffice for the channel in question; and if they *did* rest upon the sand instead of floating, would not the obstruction to the water-way be surmountable by culverts, as I believe they are called, in the abutments on either side? The channel of the river at low water does not exceed fifty or sixty yards, and therefore could not the piers be so situated as not to trench upon the water-way at all during low water? It is also to be recollected, that whenever a trow or other vessel is once sunk in the river, it is even in two or three tides so buried and secured in sand as to be irrecoverable. It does not therefore appear to me that settled piers upon the *floating construction*, leaving the water-way at low tide clear, would, with the precaution of culvert approaches before mentioned, be obstructive of the navigation, which, by the way, is not attempted at low water by vessels of any burden.

As very little money could be raised for *ornament* or *elegance*, and Mr. Mactaggart has supposed that such a bridge could be raised for more than a mile at the cost of only £40,000, could not the *minimum* of expense for only a quarter of that distance be proportionally low?

If such a plan is in all respects not feasible, I ask this question—one side of the river being elevated rock, and the other flat meadow, could not the matter be brought cheaply to bear, by only a tower on the flat side raised to a sufficient height? for there is plenty of rock on the spot, and turnpike roads, running to the water's edge on all sides.

It may be asked, why I have not taken professional opinion? I answer, that I have no interest whatever, except an abstract one, in the matter; that I am afraid of such expensive estimates as would deter; and that if by the favourable opinions of your correspondents I can make out a case I shall then take professional opinion.

A. B. C.

IMPROVED OIL FILTER.

By J. Robison, Esq., of Edinburgh.

In a communication to the Society of Arts, Mr. Robison states, that having witnessed the difficulties and waste which takes place in filtering and clearing oil from its dregs, in which operation, as it is usually conducted, a great deal of the advantage which is gained by repose and subsidence is again lost in drawing off the oil to pass it through the filter, it appeared to him, that by introducing water through a regulated aperture, and from a height sufficient to give the requisite hydrostatic pressure into the bottom of a butt of oil, and

making a communication from the top of a butt to a filter, acting *per ascensum*, all the advantages arising from refuse and subsidence would be retained, and by adapting the nature of the filter to the quality of the oil, the contents of any butt might be easily and quickly separated into three or four portions of different degrees of value. Mr. Robison concludes by suggesting the following mechanical arrangement:—

Reference to Plate XIX., fig. 4. *n* is a cistern of water, which communicates by the pipe *a* with the bottom of the butt of oil, *g*. *f* is the filter raised on feet, and standing on the heading of the butt, with which it communicates by the pipe *b*. *e* is a perforated plate above the lower chamber of the filter, and *k* is its discharging cock. *c* is the middle chamber filled with charcoal, or any other suitable substance. The partition between this and the upper chamber *d* is a perforated plate, and *l* is the discharging pipe of that chamber.

The butt containing the oil being connected with the apparatus already described, the cock of the pipe *a* is to be turned, which will allow the water to flow into the butt. At the same time the cock of the pipe *b* being opened, the upper part of the oil, and therefore the purest, first flows into and fills the lower chamber of the filter, and is followed by the less pure portions, according to their respective specific gravity; but, as the pipe enters this chamber at the top, those impurities that are considerably heavier than the oil will subside to the bottom, and are from time to time to be discharged through the cock. The rest of the oil rises through the perforated plate, is separated from the lighter impurities by the charcoal, or sand in the middle chamber, and then passes through the upper plate into the top chamber, whence it flows through the cock *l*.

The two perforated plates must rest on rings or projecting ledges, that the charcoal may be renewed, and the lower plate may be taken out occasionally, and cleared from the dregs, which otherwise would stop up its holes.

OARS TO BE WORKED BY ONE HAND.

By Lieut. Williams, R. N.

By the use of this invention any person who has lost an arm may row a boat with almost the same facility as a man with two arms, Mr. Williams having himself but one arm has proved its utility experimentally. In a communication to the Society of Arts, he observes, "there are many poor watermen at the different sea-ports, who keep a boat for a living, and from being themselves maimed are compelled to have a man with them to row one of the oars or paddles: now, this invention will obviate the necessity of any assistance, as in very severe weather I have been out alone in Cowes Roads, the boat being steered by the common yoke and ropes passing thence to the legs. The simplicity of the thing almost precludes the necessity of explanation, although it has undergone considerable modifications and improvements in bringing it to its present state.

"The leading properties of the machine are, that the paddles go forward together to enable the boat to move her a-head, or aft to back her astern, and with half a turn of the wrist they may be feathered. By unshipping one paddle out of the row-lock, she may be pulled or backed completely round. Another advantage is, that by merely taking out the two screws, which is done immediately, the oars are separated, and may be used by two persons as usual. The combined oars also stow in the boat as snugly as the common ones, and can be thrown in or out quite as smartly."

Reference to engraving, Plate XIX., figs. 1, 2, *and* 3. Fig. 1 gives an upper view of the rower's handle and the joints. Fig. 2 is a side view of the same; and fig. 3 shews the same on a smaller scale applied to a boat. *a a* are the oars connected to the handle *b*, by the two pair of joints *c c* and *d d*. The former allow unlimited fore-and-aft motion, while the stops *e e* in the joints *c c* prevent the oars from dipping too deeply. By taking out the screws *f f* the two oars may be immediately disengaged. One of the oars can at pleasure be thrown along the side of the boat, while pulling at the other, in order to pull the boat round. In this case the oar at rest receives no motion from the other, except in a direction to move it fore and aft, which is no inconvenience.

PATENTS FOR COMMUNICATING HEAT.

From a desire to encourage *constant* readers we give insertion to the following letter, though we must confess our inability to discover the precise application of the reasoning. Our correspondent complains of the want of ingenuity in the patented inventions described in our last number, and he adduces Mr. Shand's invention as an example, which he denounces, in the first place, because the patentee is of *The* Burn, Kincardineshire, we presume it would have been equally bad in our correspondent's estimation if it had been invented at *The* Hyde, in Middlesex, or *The* Hague, in Holland, though we cannot precisely ascertain why; but it is condemned, in the second place, because it is identical with the invention described in the *Register of Arts, Vol. II., p.* 267, new series, alluding to Beal and Porter's new method of applying heat. Now, we have also considerable difficulty in admitting this to be a reason for concluding the invention to be devoid of "ingenuity or importance;" for, if our correspondent should have found Beal and Porter's method of applying heat insufficient, we strongly suspect that he has not made the experiment fairly, as we can from personal observation inform him, and many other constant as well as occasional readers, that the method is both easy in practice and effectual in operation.

TO THE EDITOR.

Sir,—Your Register for the present month is truly a "Journal of Patent Inventions," as it contains descriptive particulars of fifty-

nine patents, and the titles of twenty others recently obtained; I must, however, confess, that I have been more struck with the number than with the ingenuity or importance of the inventions you have described. It strikes me, that some among these patentees must have felt the money burning in their pockets, and anxious to get rid of it, have chosen the Patent Office as a place equally amusing for that purpose, and much more efficacious than a visit to the elephant or the Collosseum. This seems to have been peculiarly the case with one among the tribe, who has taken out two patents in one month, at an expense of many hundred pounds, where no possible advantage could exist beyond what I have hinted at. This gentleman is represented as of *The* Burn, in Kincardineshire. Now, Sir, although a cockney, I know enough of geography to be aware that this shire is situated somewhere in the Land of *Cakes*. (Its being honoured as the residence of Mr. William Shand is certainly no reason why it should cease to be called the Land of *Cakes*.) But I also thought that every shire in that land was intersected by *Burns* running east, west, north, and south. This gentleman's residence, however, is probably called *The* Burn, *par excellence*, to perpetuate the memory of this double burning of the owner's pocket, which sent him on this errand of wholesale profusion to the Patent Office.

Mr. William Shand, of the Burn, in Kincardineshire, if he had travelled with his pipe and crook from his rural retreat, I will not say to London, that would have been a needlessly long journey, but to the Modern Athens, might have consulted fifty scientific works that would have shewn his "improvements in distillation," separated from their clumsiness and inefficiency, and a modern invention for communicating heat, precisely and in every respect the same as you have described his patent, only that Mr. Shand has ingeniously but unnecessarily contrived a little more work for the coppersmith. If you refer, Mr. Editor, to your No. 41, for August 20, 1828, you will see the identical invention.

Seriously speaking, it really is a pity when persons, who think themselves endowed with inventive powers, do not inquire what has already been effected, before they squander their perhaps hard earnings or painful savings in purchasing for themselves disappointment and ridicule.

I am, Sir,
Your obedient Servant,
And your Constant Reader.

March 1, 1830.

ON COLZA OIL.

Extract of a Letter from Thomas G. Clemson, Paris, to Jacob Green, M. D. Professor of Chemistry in Jefferson Medical College, Philadelphia.

Paris, September 18, 1828.

Dear Sir,—In accordance with the wish which you expressed when you were in Paris, I send you the following remarks respecting the *oil* that is burnt throughout France.

It is known by the name of Colza Oil, *Huile de Colza*, and is extracted from the grain of the Brassica Arvensis, or Campestris, a species of cabbage.

The Colza is very much cultivated throughout France and the Netherlands on account of its various and useful qualities. In the north of France, and particularly in the environs of Lille, the greatest possible attention is paid by the inhabitants to its production. The seed is sown during the month of July, as we sow our seed for the purpose of procuring cabbage plants. The shoots are transplanted in the month of September—a cloudy day being preferred. A man goes a-head, making holes in the earth, at a distance of about twelve inches from each other; he is immediately followed by a child, who puts into each hole a single plant; a third person finishes the operation by closing the earth around the plant by means of a hoe. When the seed becomes ripe, which generally happens in the month of July of the following year, the plant is cut, tied in small bundles, and put under a shed, or any covered and airy place, to dry. The grain is beaten out, and cleaned in the manner commonly used for the extraction of wheat or other grain, and is then treated for the oil. As the oil comes from the press it may be directly used with potash for the fabrication of soft soap; but if intended for burning, it is necessary that it should undergo another preparation, in order to separate from it its mucilage and the colouring matter which prevents its ready combustion. We are indebted to M. Thenard for the method of purification. It consists in mixing two parts of sulphuric acid (concentrated) with a hundred parts of *oil*, which are to be well stirred together until the acid combines with the mucilage and colouring matter, which are gradually precipitated in flakes of a blackish green colour, after which a quantity of water equal to double that of the oil is added; the whole is then freely agitated with the intention of depriving the oil of the free acid; it is then left to settle for the space of ten days, at the end of which time the oil which is upon the surface of the water is decanted into tubs, in the bottom of which are holes filled with cotton, through which the oil is allowed to filtre, when it is perfectly pure. This method of purification is applicable to all seed oils. The oil of Colza thus prepared has very little odour, is of a yellow colour, and has a sweetish taste. It is not very soluble in alcohol. When congealed it crystallizes in small needles diverging from a centre.

Your's, &c.,

THOMAS G. CLEMSON.

Remarks by the Editor of the Register.—This *Huile de Colza* is nothing more or less than our English *rape oil*, made from the same kind of plant, and by nearly the same process.

LIST OF NEW PATENTS SEALED.

STEAM BOILERS.—To J. Rawe, Jun., of Albany Street, Regent Park, Middlesex, being one of the people called Quakers, and J. Boase, of the same place, for certain improvements in steam boilers.—Dated 30th March, 1830.—Specification to be enrolled in six months.

BEER, ALE, &c.—To W. Aitkin, of Carron Vale, Scotland, for certain improvements in the means of keeping or preserving beer, ale, and other fermented liquors.—30th March, 1830. Six months.

DISTILLING AND RECTIFYING.—To D. Towers Shears, of Bankside, Borough of Southwark, Surrey, for certain additions to and improvements in the apparatus used in distilling, &c.—31st March, 1830.—Two months.

GAS.—To J. Collier, of Newman Street, Oxford Street, St. Mary-le-bone, Middlesex, and H. Pinkus, of Thayer Street, Manchester Square, in the same parish, for an improved method and apparatus for generating gas for illumination.—5th April, 1830. Six months.

STEAM ENGINE, &c.—To W. A. Summers, of St. George's Place, St. George's in the East, Middlesex, and N. Ogle, of Millbrook, Hants, for certain improvements in the construction of steam engine and other boilers or generators applicable to propelling vessels, locomotive carriages, and other purposes.—13th April, 1830. Six months.

TO OUR READERS.

In acquainting our readers that the present number concludes the Fourth Volume of the New Series, we beg to call their attention briefly to the peculiar claim to support which the work possesses, namely, that of giving, in addition to the matter usually contained in publications of the kind, *a descriptive account of* EVERY *newly-patented invention and discovery as soon as they are enrolled in Chancery,*—a species of information, although of the highest interest, and of the utmost practical value, has never before been presented to the public but in a very partial degree. The machinist and the inventor, who propose to speculate in a patent, may therefore through this medium be always informed of what other ingenious individuals have accomplished before them, and thus in numerous instances avoid disappointment and loss, while the philosopher will be gratified in having constantly exhibited to him a correct view of the progress of art and science. A reference to the Index will at once shew that several hundred new patents are described in the present volume.

The Editor has likewise to announce that having made some arrangements, by which he will be able to devote more time to the work than he has done recently, he hopes that the succeeding volume will evince a considerable improvement in the matter as well as the illustrations.